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THE BODILY PROPORTIONS OF WOMEN IN THE UNITED STATES; BASED UPON MEASUREMENTS TAKEN FROM ONE HUNDRED SMITH COLLEGE STUDENTS.

By Harris Hawthorne Wilder, Ph.D., and
Margaret Washington Pfeiffer, M.A.

(Continued from page 3 of cover.)

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Introduction.

When White in 1794, basing his assertions upon observation of both skeletons and living men, made the statement that the forearm of negroes, in proportion to the upper arm, was longer than in white men, he inaugurated the science of comparative anthropometry, and showed that there were differences in the bodily proportions of the different human races. Differences of this sort seem to have been unrecognized before this, even by artists and sculptors, who from the time of the Egyptian carvings had elaborated and even emphasized the racial characteristics of the face and head, but had given no heed to differences in the other parts of the body. It is thus possible that the classic sculptors of Greece and Rome used as models indifferently their own people and African slaves, which may explain the asserted negroid proportions of the Apollo Belvidere.

Thus the assertion of White was an advance upon new ground, and although it was accompanied by neither detailed measurements, calculation of averages, or indices, it was yet of great value in the development of the subject. After this, however, the work rested for forty-four years, when, in 1838, Humphrey made careful measure-

ments, not only of humerus and radius, but also of femur and tibia, of twenty-five mounted skeletons of negroes and the same number of skeletons of white men. He compared each individual length with the total height of the skeleton belonging to it, taken as 100, thus obtaining indices which could be directly compared. In this he corroborated White in regard to the long forearm (radius) of negroes, and found a corresponding greater length in the lower leg (tibia) of this race, hitherto unsuspected. He found, for example, that the average humerus in the two races bore practically the same proportion to the total height, 19.52% in negroes and 19.54% in whites, while the figures for the radius, also expressed in percentage of the total height, were respectively 15.16 and 14.15%. In the same way the figures for the femur were 27.40 and 27.51%, taken in the above order, while those for the tibia were respectively 23.23 and 22.15%.

But by this time other anthropologists had become interested in racial differences in proportions, and under the critical scrutiny of Broca this subject received still more careful treatment. He pointed out the fact that a total height obtained from an articulated skeleton depended too much upon the preparator who put it together, and hence substituted for Humphrey's standard the lengths of the long bones themselves, comparing them now with the length of the femur, now with that of the radius, and again with humerus + radius, or femur + tibia, yet with the same final result.

The next great advance in treating the general subject of racial anthropometry was the realization that many of the bones could be measured practically as well in the living subject by ascertaining certain superficial landmarks; also that certain external points, such as the umbilicus, and the nipples, were also of value in the study of individual proportions. This line of work, the anthropometry of the living, developed naturally in the field, as osteometry had developed in the museum, and was the direct result of the series of great scientific voyages, like those of the *Novarra* and the *Challenger*, characteristic of the last third of the nineteenth century. Naturally in the development of physical ethnology the facial features had long received much attention, and had become the subject of careful measurements with averages and indices, and the extension of this work to the rest of the body naturally followed.

During this epoch, in 1882 to be precise, a young anthropologist, M. Alphonse Bertillon, noticing the individual character of bodily measurements, saw in them important data for the solution of the difficulty which had up to this time confronted the judicial arm of the

government, that of the personal identification of criminals, and inaugurated the famous system of "Bertillonage," based upon eleven easily taken bodily measurements, a system that has since yielded the most surprising results and has been adopted by all civilized countries.

The investigators of this period began by measuring the distances between landmarks, that is mainly the lengths of the long bones, directly, as had already been done with the shorter distances involved in the head and face; but it was soon seen that if the subject were standing erect, with heels together, in military position, it was necessary only to ascertain the exact height from the floor of the various landmarks, and obtain the lengths and distances desired by subsequent subtractions, thus sparing both the subject and the mensurator in the active work of measuring. The humerus length, for instance, could be accurately measured by subtracting the total height of the head of the radius from the floor from the similar figure for the height of the acromium, while in cases involving paired landmarks, such as the distance from the nipple level to that of the umbilicus, subtraction of heights is the simplest method of obtaining the distance desired.

Thus, by the first years of the present century, the anthropometry of the living body had become an active branch of the subject, and although by the nature of the case similar measurements were taken by investigators, there were numerous minor differences in the landmarks used, the instruments employed, and the measurements emphasized. To meet this difficulty and so standardize the work of all investigators so that the data from all sources could be directly compared, a committee was appointed by the Fourteenth International Congress of Anthropology and Archeology, meeting in Geneva, Switzerland, in September, 1912. Their report, which appeared in English, German, French and Italian, prescribes for general use 49 separate data, of which 39 are linear distances (including heights from floor), 11 are girths (perimeters), and two are contours (outlines of hand and foot).[1]

Up to the present time, however, although anthropological data of living male subjects are now abundant, and include many races, measurements of females, other than such easily obtained ones as total height, arm stretch, and the facial features, are extremely rare, and

[1] This committee consisted of 23 members: 6 were French, 4 Italian, 4 English, 3 Russian, 2 from the United States, and one each from Germany, Spain and Hungary. The committee was presided over by the distinguished Roman anthropologist, Giuseppe Sergi, and the American members were Hrdlička and MacCurdy.

are practically limited to three papers: that of Frau Jochelson-Brodsky, on certain of the Siberian tribes, collected when on the Jesup expedition during the long and enforced rest of the Arctic night; that of Koganei on Japanese and Ainu women; and that of Fräulein Sara Teumin on her fellow-students in the University of Zürich, Russians and Russian Jewesses. Fischer of Freiburg had the data concerning over a hundred young women from Baden just before the war, and was getting the notes ready to publish, but we cannot tell at present when these important data will be available.

Aside from such full records, covering the entire body, there are three classes of papers from which some data may be obtained, but as the object differs in each case, they are hardly to be included in the present field. These are (1) obstetrical measurements of the pelvic proportions, (2) the measurements made by the departments of physical education in colleges and other gymnasiums, and (3) the measurements of school children, for the study of growth. These all differ materially both in ground covered, in subjects, and in the purpose of the investigation. Mentioning but a few of these papers, there are those of Osawa on the pelvis of Ainus and Japanese, of Prochownik on that of Germans, of Schröter on that of Poles, Polish Jews and Russians, and of Stratz on that of the Javanese. On school children, where the data are generally limited to such measurements as height, arm stretch, trunk length, and proportions of head and face, there are the studies of Bowditch on the school children of Boston, and of West on those of Worcester; later in this field there is the paper of Fräulein Olga Spitzer on 1000 school girls from Krakau. From the gymnasiums of colleges and universities we have the paper of Hall on students from Haverford, and that of Sargent from the Hemenway Gymnasium of Harvard.

Of strictly anthropometric value, dealing with bodily measurements other than those of the head and face, we have two papers: that of Rodes (1905) on the thoracic index of the negro, and that of Miss Marjorie Johnson (1911) on the position of the umbilicus, taken upon students of the University of California.

The field is thus peculiarly clear for such papers as the one here presented, and it was for the purpose of supplying an important series of data which were actually non-existent that we set ourselves to work to collect them.

The scope and treatment of this paper will be seen to closely resemble that of Fräulein Sara Teumin, although it differs in the nationality of the subjects, being here mainly British in origin, or at least from a

western European ancestry, while hers were mostly either Jewish or Slavic, and arose originally from eastern Europe, or from southwestern Asia.

In addition to the data presented by Fräulein Teumin, we have introduced several new features of considerable value, such as the Standard Deviation, which gives the amount of deviation from the average, divided up among the items, and the Coefficient of Variation, which allows the amount of variation in different measurements to be directly compared. Thus by the aid of these figures we can definitely assert that the femur, with a coefficient of length variation of 5.85, is less variable than the tibia, with a length coefficient of 6.26. On the other hand, the total length of the leg, from trochanter to floor, including these two lengths, together with the height of the foot, varies less than either alone, 4.42, and suggests that in some way a shortness of one of these three elements of which the entire leg length is composed, is compensated for by an extra length in one of the others. The total height, although distributed in the 100 subjects between 1504 and 1760 mm., taking into consideration the great length dealt with, is not so variable as would seem at first sight (3.33), and is thus seen to be proportionately less variable than the lengths of any of the long bones. Again, while the length of the arm stretch is very variable (9.70), such is the correlation between this and the total height, taking individuals by themselves, that the coefficient of variation of the index between these two, arm stretch and total height, varies very little indeed (2.2). As would be expected, extreme variations are found between points which are independently movable, such as the distance between the level of the vertebra prominens and that of the incisura sterni (sitting), which is 20.5.

Certain of the possible correspondences suggested by these figures show the desirability of calculating correlations for these, and these, too, we have attempted in a few cases, and show (1) the correlation of the length of arm to the length of leg, (2) the correlation of the length of humerus to that of femur, (3) that of arm length to total stature, and (4) that of hand to foot. In some of these the correlation is striking; in other cases there is little relation between the measurements taken, and again, in the humerus length and femur length there seems to be no correlation. This is a comparatively new direction of work and may be looked upon to give important results in the future.

In making acknowledgments to those who have definitely furthered the completion of this paper, we would place first and foremost the

100 Smith College students who have offered their services as material for this study. Each subject has given us an hour or two out of a full schedule, and submitted herself to an ordeal at least as tedious as that of the dressmaker, and, in this case, without any benefit to herself. Aside from our associates in the Department of Zoölogy, we remember with special gratefulness the work of Miss Mary Head, former Curator of the Department, who aided in the taking of measurements. We wish also to acknowledge the assistance rendered us by Dr. Stuart Chapin, Professor of Sociology, for advising us in the matter of compiling our statistics, and to Professor Ralph Wheaton Whipple, Professor of Geology at Marietta College, who drew for us the graphs and charts and put them in form suitable for publication.

Material and Methods.

The measurements that were taken were in general those recommended in the "Manual of Anthropometry" (Blakiston, 1920) of the senior author, especially Nos. 1–40. These consist mainly of the height from the floor of the chief landmarks of trunk and limbs, and various breadths, mainly of head, face, and trunk. Girths, measured by tape measure, were not included, since they are variable in the same individual and vary with the state of health. From the measures of heights from the floor, or from a table-top in a sitting subject, various other important measurements may readily be obtained by subtractions, thus saving the time of both subject and measurer. The detailed list of measurements, taken directly from our printed card designed for such use, is as follows:

1 age
2 stature
3 arm stretch
4 ht. of tragus
5 ht. vertebra prominens
6 ht. incisura sterni
7 ht. acromion
8 ht. nipple
9 ht. umbilicus
10 ht. ant. ventral spine of ilium
11 ht. trochanter
12 ht. symphysis
13 ht. capitellum of radius
14 ht. styloid of radius
15 ht. tip of middle finger
16 ht. knee
17 ht. internal malleolus
18 biacromial breadth
19 cristal breadth
20 trochanteric breadth
21 bimammillary breadth
22 spinal breadth
23 thoracic breadth, xiphoid level
24 thoracic depth, xiphoid level
25 foot length
26 sitting ht.
27 ht. vert. prom., sitting
28 ht. incis. sterni, sitting

29 ht. acromion, sitting
30 head length
31 head breadth
32 least frontal breadth
33 biocular breadth
34 bizygomatic breadth
35 bigonial breadth (jaw)
36 chin to hair
37 chin to nasion
38 nasion to prosthion
39 nasal length
40 nasal breadth
41 ear length
42 ear breadth
43 color of eyes
44 color of hair
45 color of skin

Placed in tabular form, in the order presented in this paper, these measurements and those computed from them are as follows:

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The instruments are mainly those obtained from P. Hermann, Zürich, and designed by Dr. Rudolf Martin. These instruments are the following:

Anthropometer; it can also serve as a slide compass.
Craniometer.
Pelvimeter.
Slide compass.

For the various cases in which color comes into consideration, namely, eyes, hair and skin, we used the three color tables, also manufactured by Hermann, as follows:

eye-color table, prepared by Dr. Rudolf Martin.
hair-color table, prepared by Dr. Eugen Fischer.
skin-color table, prepared by Dr. von Luschan.

An osteometric board, designed primarily for measuring the lengths of bones by Dr. Paul Broca, was found useful in the measurement of foot lengths. This was made locally. A Mannheim slide rule was found especially useful in the computations involved in the work. This was manufactured by Keuffel and Esser, New York.

The statistical formulae that were used are the following:

In all the tables the *arithmetic mean* [1] was calculated according to the formula

$$M = A + \frac{1}{N}\Sigma\,(f.\,\xi)$$

N = total number of observations.
M = the arithmetic mean.
A = the arbitrarily chosen value of the mean.
Σ = Summation.
ξ = the deviation of a given class from A.
f = the frequency of a given class.

The difference from A of M is obtained by this method in class intervals and must be reduced to units of measurement before the mean is found.

[1] Cf. Yule, p. 110.

For the measurement of dispersion the *standard deviation* [2] was used, the formula being

$$s^2 = \sigma^2 + d^2$$

σ = the standard deviation.
d = the difference between M and A.
s = the root-mean-square deviation from A and is defined by the equation [3]

$$s^2 = \frac{1}{N} \Sigma (\xi^2)$$

For a measure of relative dispersion the *coefficient of variation* [4] was used, the formula of which is

$$v = 100 \frac{\sigma}{M}$$

v = the coefficient of variation.

The points used in the measurements are those described by the senior author in his "Manual of Anthropometry," previously mentioned. The most of these are obvious and superficial, like the anterior ventral spine of the ilium, or the incisura sterni. Others, like the vertebra prominens, are brought into prominence through certain motions, by which they may be easily located and the skin marked, after which the subject may resume her conventional position, and the measurement may be easily effected. Some cases require finding the separation between two bones, like that between radius and humerus in the elbow, or that at the knee on the inside of the leg, and these, after a little experience, can be readily and accurately found. The majority of the subjects were themselves students of anatomy and took a lively interest in the work.

In cases where the breasts showed any tendency to sag, the nipple measurements were omitted. The determination of the point on the trochanter to be used (trochanterion) is at best somewhat uncertain, and the measurements that involve this point are felt to be a little unreliable. The junior author, who took charge of the measurements, sought in ascertaining this point "the deepest point in the extended depression ectad of the great trochanter"; Fräulein Teumin says "Die Trochanterhöhe direct zu messen, ist wegen des durch die starke Muskulatur sehr erschwerten Abtastens des Trochanters unbequem."

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[2] Yule, p. 135. [3] Ibid., p. 134. [4] Ibid., p. 149.

The point may always be felt approximately by seeking the bottom of the lateral depression often so conspicuous a feature of muscular individuals, and the establishment of this point is often assisted by the subject's abducting the leg, while standing on the other. In spite of all this it is a very uncertain point, and not to be too completely relied upon.

Theoretically, for anthropometrical purposes the subjects should present themselves before the measurer unclothed, but certain loose garments which have no binding influence on the body or its parts may be allowed. We have found by actual measurements that with subjects clothed with a modern bathing suit and again without clothing the difference is negligible, and this use of bathing suits often renders feasible an extensive study of anthropometry involving both sexes.

The one hundred girls used as subjects were students at Smith College. They were thus in the modern sense "Americans," which means that in every case their ancestry was derived from the nations of western Europe. The three Jewesses probably could trace their ancestry into western Asia, but their number was negligible. An endeavor was made to ascertain the ancestry in each case, but this knowledge was ill-defined except in those instances whose families had immigrated recently. There were representatives of the principal European nationalities, but the large majority came from families that had been in this country for a number of generations, and would be spoken of as "Anglo-Saxons," a phrase with very little meaning.

List of nationalities	*Number of individuals*
English	43
English-Scotch	8
English-Irish	3
English-Irish-Welsh	3
English-Irish-Scotch	2
Irish	2
Scotch-Irish	6
English-French	4
English-German	5
English-Dutch	6
Scotch-Dutch	2
Irish-German	1
Welsh-French	1
German	6

List of nationalities	*Number of individuals*
German-French	3
Russian (Jewish)	3
German-Dutch	1
German-Italian	1
	100

The subjects were all young adult females between 17 and 27 years of age, but with an average of twenty or twenty-one years. Their age distribution is shown by the following table:

Age in years	*Number of individuals*
17	2
18	13
19	13
20	28
21	27
22	8
23	4
24	3
25	1
26	0
27	1
	100

The mean is 20.4 years.

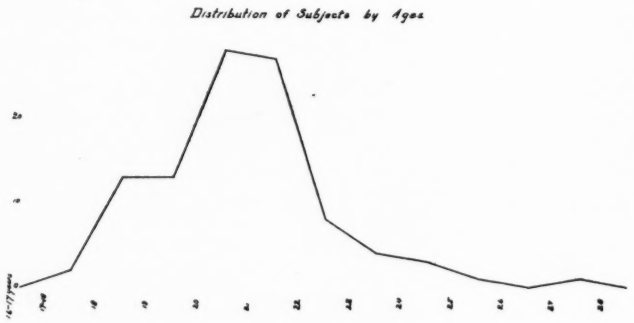


FIGURE 1.

I. Head Measurements.

TABLE 1.

Length of Head.

Class	*Frequency*
173 to 173.99 mm.	2
174	2
175	1
176	1
177	1
178	3
179	0
180	6
181	5
182	2
183	5
184	5
185	8
186	7
187	11
188	9
189	4
190	4
191	5
192	4
193	4
194	5
195	0
196	3
197	1
198	0
199	0
200	1
201	0
202	1
	100

The mean is 186.88 mm.
The extremes are 173 mm.
202 mm.
The standard deviation is 5.81 mm.
The coefficient of variation is 3.10

Figure 2.

TABLE 2.

BREADTH OF HEAD.

Class	*Frequency*
137 to 137.99 mm.	1
138	1
139	1
140	4
141	2
142	4
143	8
144	6
145	8
146	13
147	9
148	7
149	6
150	12
151	5
152	4
153	2
154	2
155	3
156	1
157	1
	100

The mean is 147.11 mm.
The extremes are 137 mm.
157 mm.
The standard deviation is 4.19 mm.
The coefficient of variation is 2.80

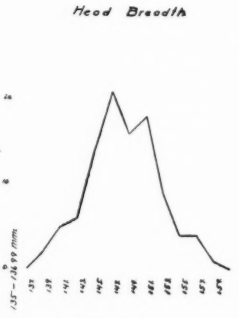


FIGURE 3.

TABLE 3.

CEPHALIC INDEX.
(Length-breadth index.)

Class	*Frequency*
71.50 to 71.99	1
72.0	1
72.5	0
73.0	0
73.5	5
74.0	1
74.5	3
75.0	3
75.5	2
76.0	3
76.5	4
77.0	5
77.5	3
78.0	7
78.5	12
79.0	8
79.5	5
80.0	11
80.5	4
81.0	2
81.5	7
82.0	3
82.5	4
83.0	1
83.5	2
84.0	1
84.5	0
85.0	0
85.5	0
86.0	0
86.5	2
	100

The mean is 78.96 (mesocephalic)
The extremes are 71.5
86.5
The standard deviation is 2.90
The coefficient of variation is 3.70

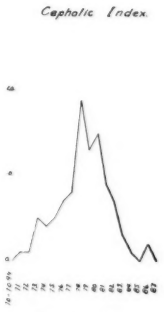


FIGURE 4.

RESULTS OF OTHER AUTHORS: CEPHALIC INDEX.

Race	*Author*	♂	♀
Ainu	Koganei	77.3	78.04
Ainu Yezo	Deniker	77.8	
Korjaks Kamtschatka	Brodsky	78.1	78.0
Kamtschatkans	"	78.5	77.4
Tunguses Kolyna	"	78.5	79.4
Japanese	Deniker	78.5	
Tunguses Gischiga	Brodsky	78.7	79.3
Ostjaks	Iwanowsky	79.23	
Korjaks Gischiga	Brodsky	80.3	80.0
Jukagirs	"	80.4	80.0
Tunguses Anadyr	"	80.8	80.3
Asiatic Eskimos	"	80.8	79.7
North Tunguses	Mainoff	81.39	
Tschuktsches	Olsufyeff	81.79	
"	Brodsky	82.0	81.8
Koreans	Deniker	82.06	
Kasan Tatars	Iwanowsky	82.08	81.84
Transbaikal Tunguses	Talko-Grinzewitch	82.23	
Manchurians	Pojarkoff	82.32	
Jakuts	Witaschewsky	82.33	
Baschkirs	Iwanowsky	82.55	
Kalmucks	"	82.57	
Jakuts	Mainoff	82.66	
South Tunguses	"	82.69	
Orotsches	Iwanowsky	82.81	
Jakuts	Hecker	83.01	
Sojots	Iwanowsky	83.03	
Jakuts	Brodsky	83.1	83.3
Samoyedes	Iwanowsky	83.95	
Lapps	"	84.00	
Torgouts	"	84.73	
Manchus	Ujfalvy	84.91	
Kara Kirghiz	Iwanowsky	85.17	
Buriats	"	85.87	
Giljaks	Deniker	86.03	
Kirghiz	Iwanowsky	87.10	

TABLE 4.

HEIGHT OF HEAD.

Class	*Frequency*
100 to 104.99 mm.	1
105	4
110	5
115	9
120	15
125	23
130	21
135	8
140	10
145	3
150	0
155	1
	100

The mean is 128.14 mm.
The extremes are 100 mm.
155 mm.
The standard deviation is 10.13 mm.
The coefficient of variation is 7.90

TABLE 5.

INDEX OF HEIGHT OF HEAD TO TRUNK LENGTH.

Class	*Frequency*
15 to 15.49	1
15.5	2
16.0	3
16.5	5
17.0	4
17.5	10
18.0	13
18.5	14
19.0	11
19.5	7
20.0	9
20.5	4
21.0	9
21.5	2
22.0	4
22.5	0
23.0	2
	100

The mean is 18.61
The extremes are 15.1
23.0
The standard deviation is 1.66
The coefficient of variation is 8.90

TABLE 6.

INDEX OF HEIGHT OF HEAD TO TOTAL STATURE.

Class	*Frequency*
6.0 to 6.49	1
6.5	5
7.0	18
7.5	35
8.0	26
8.5	14
9.0	1
	100

The mean is 7.88
The extremes are 6.0
9.4
The standard deviation is 0.60
The coefficient of variation is 7.62

TABLE 7.

HEIGHT-LENGTH INDEX.

Class	*Frequency*
55 to 55.99	2
56	0
57	0
58	0
59	3
60	2
61	4
62	4
63	5
64	4
65	6
66	6
67	9
68	7
69	10
70	8
71	4
72	4
73	4
74	7
75	1
76	2
77	4
78	0
79	3
80	0
81	0
82	1
	100

The mean is 68.70
The extremes are 55.0
82.0
The standard deviation is 5.37
The coefficient of variation is 7.80

TABLE 8.

PHYSIOGNOMIC FACIAL LENGTH.

Class	*Frequency*
160 mm.	2
162	5
164	4
166	3
168	8
170	9
172	10
174	14
176	7
178	3
180	9
182	7
184	9
186	5
188	3
190	1
192	0
194	0
196	0
198	1
	100

The mean is 175.59 mm.
The extremes are 160 mm.
190 mm.
The standard deviation is 7.92 mm.
The coefficient of variation is 4.50

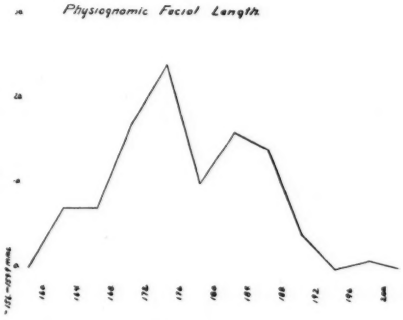


FIGURE 5.

TABLE 9.

ANATOMICAL FACIAL LENGTH.

Class	*Frequency*
98 to 99.99 mm.	1
100	1
102	0
104	3
106	1
108	9
110	16
112	11
114	10
116	6
118	17
120	7
122	10
124	5
126	2
128	0
130	0
132	1
	100

The mean is 115.35 mm.
The extremes are 98 mm.
132 mm.
The standard deviation is 6.06 mm.
The coefficient of variation is 5.30

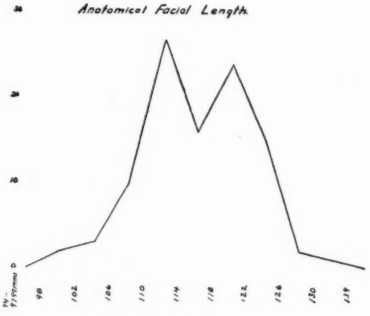


FIGURE 6.

TABLE 10.

SUPERIOR FACIAL LENGTH.

Class	*Frequency*
62 to 63.99 mm.	4
64	2
66	8
68	12
70	12
72	25
74	19
76	12
78	4
80	0
82	2
	100

The mean is 72.07 mm.
The extremes are 62 mm.
82 mm.
The standard deviation is 3.92 mm.
The coefficient of variation is 5.45

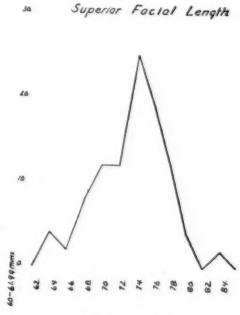


FIGURE 7.

TABLE 11.

ANATOMICAL FACIAL INDEX.

Class	*Frequency*
83 to 83.99	1
84	1
85	0
86	0
87	0
88	2
89	2
90	2
91	2
92	3
93	4
94	0
95	4
96	6
97	4
98	4
99	6
100	13
101	6
102	6
103	4
104	8
105	3
106	2
107	3
108	3
109	4
110	2
111	1
112	1
113	0
114	3
	100

The mean is 100.65
The extremes are 83
114
The standard deviation is 6.50
The coefficient of variation is 6.50

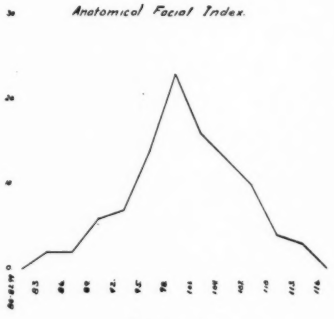


FIGURE 8.

TABLE 12.

FRONTAL BREADTH.

Class	*Frequency*
92 to 92.99 mm.	1
93	0
94	1
95	2
96	4
97	7
98	4
99	8
100	8
101	8
102	9
103	11
104	11
105	5
106	6
107	6
108	3
109	1
110	1
111	2
112	0
113	0
114	1
115	1
	100

The mean is 102.72 mm.
The extremes are 92 mm.
115 mm.
The standard deviation is 4.23 mm.
The coefficient of variation is 4.18
The frontal breadth is 69% of the breadth of the head.

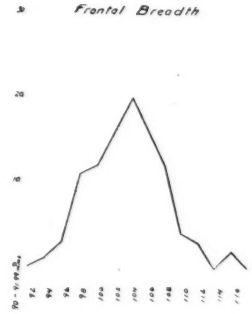


FIGURE 9.

TABLE 13.

DISTANCE BETWEEN THE EYES.
(Interorbital breadth.)

Class	*Frequency*
24 to 24.99 mm.	1
25	1
26	1
27	5
28	11
29	12
30	21
31	13
32	12
33	8
34	7
35	5
36	3
	100

The mean is 31.17 mm.
The extremes are 24 mm.
36 mm.
The standard deviation is 2.55 mm.
The coefficient of variation is 8.10

TABLE 14.

ZYGOMATIC BREADTH.
(Bizygomatic.)

Class	*Frequency*
90 to 91.99 mm.	1
92	0
94	0
96	0
98	0
100	0
102	0
104	2
106	4
108	6
110	7
112	8
114	13
116	14
118	12
120	11
122	10
124	9
126	1
128	0
130	1
132	1
	100

The mean is 116.35 mm.
The extremes are 90 mm.
133 mm.
The standard deviation is 6.10 mm.
The coefficient of variation is 5.29
The zygomatic breadth is 79% of the breadth of the head.

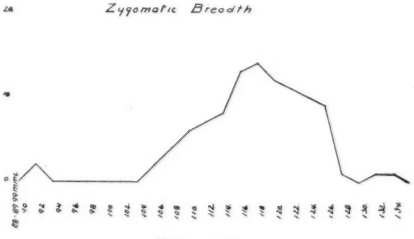


FIGURE 10.

TABLE 15.

MANDIBULAR BREADTH.

(Bigonial.)

Class	*Frequency*
84 to 84.99 mm.	2
85	1
86	2
87	0
88	1
89	2
90	4
91	1
92	0
93	3
94	8
95	3
96	6
97	12
98	9
99	12
100	5
101	6
102	4
103	4
104	4
105	4
106	3
107	1
108	3
	100

The mean is 98.27 mm.
The extremes are 84 mm.
108 mm.
The standard deviation is 5.20 mm.
The coefficient of variation is 5.30

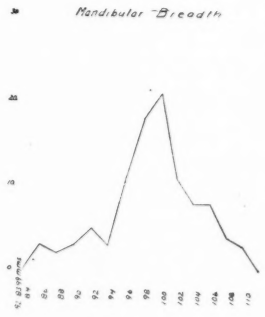


FIGURE 11.

TABLE 16.

MANDIBULO-ZYGOMATIC INDEX.

Class	*Frequency*
72 to 72.99	1
73	0
74	0
75	3
76	3
77	2
78	2
79	2
80	5
81	8
82	11
83	12
84	11
85	17
86	4
87	7
88	2
89	2
90	1
91	2
92	1
93	0
94	1
95	1
96	2
	100

The mean is 84.09
The extremes are 72
96
The standard deviation is 4.41
The coefficient of variation is 5.20

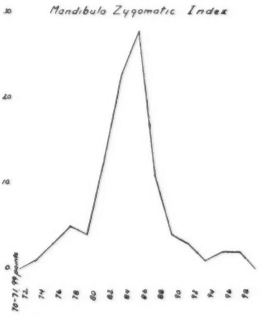


FIGURE 12.

TABLE 17.

NASAL LENGTH.

Class	*Frequency*
42 to 42.99 mm.	1
43	0
44	2
45	0
46	1
47	1
48	6
49	7
50	4
51	8
52	9
53	12
54	4
55	19
56	12
57	5
58	5
59	2
60	2
	100

The mean is 53.61 mm.
The extremes are 42 mm.
60 mm.
The standard deviation is 3.84 mm.
The coefficient of variation is 7.15

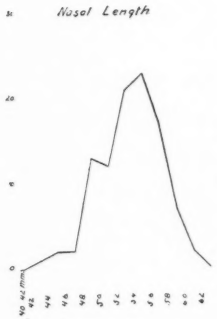


FIGURE 13.

TABLE 18.

Nasal Breadth.

Class	*Frequency*
25 to 25.99 mm.	1
26	1
27	0
28	7
29	9
30	13
31	16
32	14
33	19
34	8
35	6
36	3
37	2
38	1
	100

The mean is 32.18 mm.
The extremes are 25 mm.
38 mm.
The standard deviation is 2.37 mm.
The coefficient of variation is 7.49

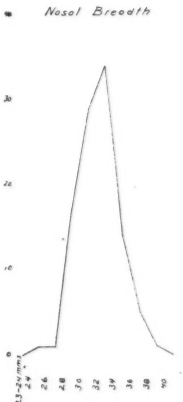


FIGURE 14.

TABLE 19.

NASAL INDEX.

Class	*Frequency*
45 to 45.99	1
46	1
47	0
48	2
49	1
50	2
51	4
52	3
53	2
54	8
55	3
56	3
57	4
58	9
59	5
60	8
61	10
62	5
63	9
64	2
65	3
66	3
67	2
68	1
69	1
70	3
71	4
72	0
73	0
74	0
75	1
	100

The mean is 59.89
The extremes are 45
75
The standard deviation is 6.04
The coefficient of variation is 10.10

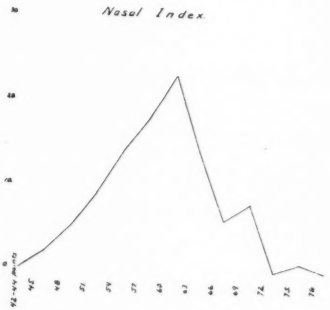


FIGURE 15.

RESULTS OF OTHER AUTHORS: NASAL INDEX.

Race	*Author*	♂	♀
Sojots	Gorostschenko	76.20	69.50
Ainu	Koganei		66.70
Kalmucks Don	Iwanowsky	73.90	
" Volga	Deniker	70.57	
Torgouts	Iwanowsky	60.46	
Nunatagmiut Eskimos	Boas		63.00
Koukpagmiut "	"		62.87
Tahltan Indians	"		62.87
Jakuts	Brodsky		64.6
Tunguses	"		66.0

TABLE 20.

LENGTH OF EAR.

Class	*Frequency*
49 to 49.99 mm.	1
50	0
51	0
52	2
53	1
54	6
55	8
56	13
57	9
58	14
59	12
60	10
61	5
62	8
63	2
64	65
65	3
66	0
67	1
	100

The mean is 58.89 mm.
The extremes are 49 mm.
67 mm.
The standard deviation is 3.16 mm.
The coefficient of variation is 5.40

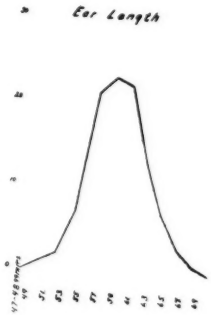


FIGURE 16.

TABLE 21.

Breadth of Ear.

Class	*Frequency*
25 to 25.99 mm.	1
26	2
27	7
28	5
29	14
30	27
31	12
32	14
33	8
34	6
35	4
	100

The mean is 30.99 mm.
The extremes are 25 mm.
35 mm.
The standard deviation is 2.16 mm.
The coefficient of variation is 6.90

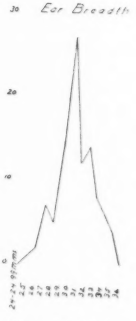


Figure 17.

TABLE 22.

AURAL INDEX.

Class	*Frequency*
41 to 41.99	1
42	0
43	2
44	3
45	3
46	9
47	8
48	13
49	4
50	18
51	9
52	5
53	7
54	6
55	3
56	0
57	3
58	1
59	2
60	1
61	1
62	1
	100

The mean is 50.63
The extremes are 41.94
62.56
The standard deviation is 3.91
The coefficient of variation is 7.72

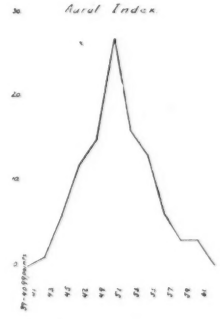


FIGURE 18.

TABLE 23.

COLOR DISTRIBUTION.

The skin, hair, and eye colors are classified according to the numbers of the color tables used

Class	EYES *Frequency*	HAIR *Frequency*	SKIN *Frequency*
1	0	0	0
2	0	0	2
3	5	2	22
4	9	8	0
5	11	24	0
6	6	3	0
7	11	13	16
8	7	26	6
9	2	10	10
10	3	3	15
11	3	1	15
12	9	3	7
13	12	2	5
14	4	0	2
15	15	0	—
16	3	1	100
17	—	0	
18	100	0	
19		0	
20		0	
21		0	
22		1	
23		0	
24		0	
25		1	
26		2	
		—	
		100	

Hair. Practically one half have light brown hair, included in the numbers 7, 8, 9. There are more with hair much darker than this intermediate color than with lighter hair. The numbers running down from 6 to 3 are all darker, 3 being an inky black. The decided

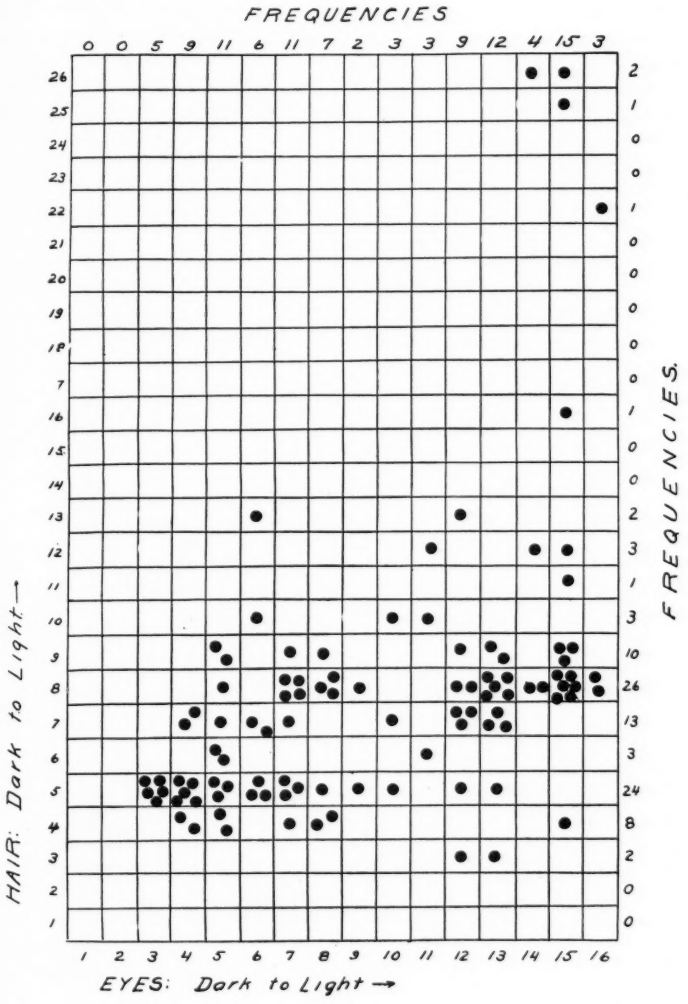

FREQUENCIES
0 0 5 9 11 6 11 7 2 3 3 9 12 4 15 3
26 25 24 23 22 21 20 19 18 7 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
2 1 0 0 1 0 0 0 0 0 1 0 0 2 3 1 3 10 26 13 3 24 8 2 0 0
FREQUENCIES.
HAIR: Dark to Light →
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
EYES: Dark to Light →

FIGURE 19.

blondes are few in number. The ordinary blonde colors are included in the numbers 11 to 16. Those with extremely light hair or hair tinged with a greenish cast are in the numbers from 22 to 26.

Eyes. There are more blue eyes than any other one color, these being however neither very deep blue nor very washed-out. There are nearly as many of a gray-blue, of a fairly dark brown and of a medium hazel. The very dark browns, the deep blues and the very light blues and the yellow hazels are few in number. The numbers from 3 to 8 include the very dark, the dark browns and the darker hazels. The numbers from 12 to 16 include the grays, the gray-blues and the different shades of blue.

Skin. Nearly a fourth of all the cases had number 3, which is a light skin with a decided rosy tint. Number 7 is light but lacks the rosy tint while the numbers from 8 to 12 are darker and generally sallow.

There is a decided correlation between the eye and hair color as is shown by the following table. Generally those with brown or dark hazel eyes have dark and medium dark hair, while those with light hazel or blue eyes have medium light and light hair.

Head Measurements: Summary.

The head is mesocephalic with a small coefficient of variation for both the length and breadth measurements as well as for the cephalic index. There is much more variation in the height of the head and in the indices between this, the trunk length and the total height. There is a moderate amount of variation in all the facial lengths, the zygomatic breadth and the mandibular breadth. The face is mesoprosopic. The range of deviation in the facial index is very large but the standard deviation and the coefficient of variation are not large. The mandibular-zygomatic index which indicates the shape of the face has a small coefficient of variation although the range is large. The majority have a decided median slant from the zygomatic arches to the angles of the mandibles. The average nose is leptorrhine but there is a very large coefficient of variation in the nasal index. The coefficients of variation of the length and of the breadth of the nose are somewhat smaller. Rather curiously the coefficients of the length and of the breadth of the ear and of the aural index are much smaller than those of the nose.

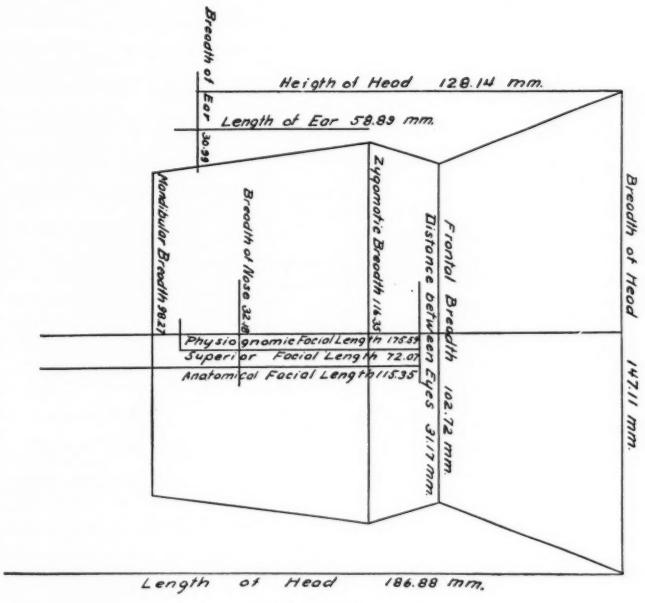

Breadth of Ear 30.91
Height of Head 128.14 mm.
Length of Ear 58.89 mm.
Mandibular Breadth 98.27
Breadth of Nose 32.18
Zygomatic Breadth 114.35
Distance between Eyes 31.17 mm.
Frontal Breadth 102.72 mm.
Breadth of Head 147.11 mm.
Physiognomic Facial Length 175.59
Superior Facial Length 72.07
Anatomical Facial Length 115.35
Length of Head 186.88 mm.

FIGURE 20.

II. Trunk Measurements.

TABLE 24.

Total Height.

Class	*Frequency*
1500 to 1519.99 mm.	2
1520	1
1540	7
1560	6
1580	8
1600	11
1620	15
1640	15
1660	13
1680	15
1700	2
1720	2
1740	2
1760	1
	100

The mean is 1638 mm.
The extremes are 1504 mm.
1760 mm.
The standard deviation is 54.60 mm.
The coefficient of variation is 3.33

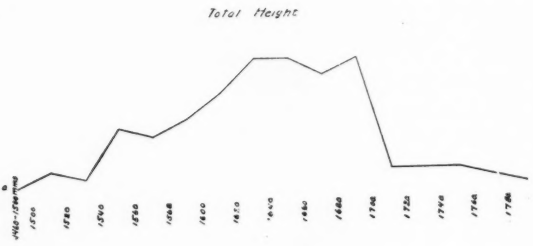


Figure 21.

Results of Other Authors: Total Height.

Europe

Race	*Author*	♂	♀
Lapps (Norway)	Mantegazza	1523	1450
Lapps (Russia)	Anutschin	1558	
Woguls	Deniker	1591	
Ruthenians	Magierowski	1595	
Polish Jews	Elkind	1610	1506
Sardinians	Livi	1619	
Spaniards	Oloriz	1620	
Polish Jews	Sneijirew	1622	
Little Russians	Talko-Grinzewitch	1625	
Tatars Volga	Deniker	1628	
Galician Jews	Maier and Kopernitzky	1628	
Roumanians	Pittard	1635	
Poles	Elkind	1639	
Italians	Livi	1640	
French	Bertillon	1641	1570
Portuguese and Spaniards	"	1642	
Russians	Rozdestwensky	1644	1528
Galician Poles	Magierowski	1645	
Mingrels	Deniker	1646	
Little Russians	Weissenberg	1648	
Gypsies	Pittard	1649	1532
White Russians	Eichholz	1650	
Poles	Teumin		1620
Little Russians	"		1540
Polish Jews	"		1550
Russians	"		1610
Roumanians	Felix and Pittard	1650	
Russians	Anutschin	1650	
South Russian Jews	Weissenberg	1651	1536
White Russians	Schedrowizky	1654	
Belgians	Houzé	1655	
Lithuanians	Boronas	1656	1546
Bavarians	Ranke	1656	
Tatars in Balkans	Pittard	1657	1547
Russians in Twer	Galai	1660	1540
People of Baden	Ammon and Fischer	1662	1560
Bulgarians	Wateff	1665	1557
Finns	Kolmogaroff	1666	1545
Little Russians	Talko-Grinzewitch	1667	1548
Roumanians (Bukowina)	Pittard	1671	
Dutch	Deniker	1675	

Race	*Author*	♂	♀
Poles	Danitowiky	1679	
Finns	Retzius	1679	1552
Fäero Islanders	Soren Hansen	1691	1584
Danes	Makeprang and Hansen	1691	1592
Danes Bornholm	Ribbing	1697	1588
Serbians	Lazarevitch	1699	
Little Russians	Tscherpourkowsky	1701	
Lithuanians (Letts)	Waeber	1705	1563
Swedes	Retzius and Fürst	1709	
Norwegians	Daae	1721	
Irish	Beddoe	1726	
English	Pearson	1728	1599
Livonians	Topinard	1736	
	Asia		
Negritos of Zambales	Reed	1463	1378
South Andaman Islanders	Census of India	1482	1402
North " "	" " "	1486	1385
Senoi	Martin	1520	1420
Semangs	Annandale	1520	
Veddahs	Sarasin	1533	1433
Kanikars	Schmidt	1536	
Igorots	Bean	1549	1467
Ostjaks	Deniker	1540	
Orotsches	Margaritoff	1545	1443
North Tunguses	Mainoff	1548	
Samoyedes	Sommier and Sograff	1550	1430
Miao-tse	Ryūzō Torii	1550	1450
Irula	Schmidt	1554	
Jukagirs	Brodsky	1560	1470
Tunguses	"	1565	1465
Jakuts	"		1488
Tóala	Sarasin	1561	1454
Ostjaks	Sommier	1563	1441
Ainu	Koganei	1567	1468
Kasia	Census of India	1569	
Menangkabau Malays	Kleiweg de Swaan	1570	
Kayan	Haddon	1572	1440
Tunguses Anadyr	Brodsky	1574	1488
Kadirs	Thurston	1577	1430
Cochin Chinese	Deniker	1578	
Ostjaks	Iwanowsky	1579	1441
Moi	Deniker	1579	
Palaung	Census of India	1581	

Race	*Author*	♂	♀
Tonkinese	Deniker and Bonifacy	1584	
Japanese	Bälz	1585	1450
South Chinese	Census of India	1585	
Tunguses Kolyma	Brodsky	1588	
Karagasses	Salessky	1589	1445
Cambodians	Mondierre and Bonifacy		1451
Anamites	" " "	1587	1464
Japanese	Miwa and Martin	1593	1472
Sundanese	Kohlbrügge	1594	1494
Schan	Census of India	1594	
Koriaks	Bogoras	1596	1491
Koriaks	Martin	1596	
Kota	Schmidt	1597	
Siamese	Annandale	1599	
Kamtschatkans	Bogoras	1601	
Tenggereses (Java)	Kohlbrügge	1604	
Battaks	Hagen	1605	
Formosans	Torii	1605	
Jakuts	Witaschewsky	1607	1498
Setchuan Chinese	Legendre	1611	
Upper Burmese	Ethnol. Survey	1619	
South Chinese	Hagen	1622	1498
Deli-Malays	"	1622	
Tschuktsches	Bogoras	1622	1520
Bugi	Sarasin	1622	
Asiatic Eskimos	Bogoras	1623	1518
Jakuts	Mainoff	1624	1512
Singalese	Census of India	1625	
Tunguses	Mainoff	1627	
Permiaks	Khomiakow	1629	1524
Bhil	Census of India	1629	
Tatars	Sneijerew (Sucharew)	1630	1517
Buriats	Talko-Grinzewitch (Hryncewicz)	1631	1530
Buriats	Iwanowsky	1631	
Torgouts	"	1631	
South Tunguses	Mainoff	1631	1530
Koreans	Jijima	1631	1530
Kalmucks	Deniker	1634	1498
Malăalis	Thurston	1634	
Jarans	Kohlbrügge and Stratz	1635	1540
Tunguses	Talko-Grinzewitch	1638	
Kalmucks	Iwanowsky	1640	1504
Kirghiz	"	1640	1511
Baschkirs	Nikolsky	1641	

Race	*Author*	♂	♀
Tatars	Varuschkin	1645	1521
Minahasses	Sarasin	1647	1544
Tschuktses	Deniker	1649	
Cossacks (Kirghiz)	Iwanowsky	1651	1503
Chinese	"	1653	
Baschkirs	"	1655	
Tschuktsches	Olsufjeff	1660	
Kara Kirghiz	Iwanowsky	1673	
Armenians	Delisle	1673	1510
Lolo	Legendre	1675	
Manchurian Tunguses	Deniker	1675	
North Chinese	Koganei	1676	
Balocks (Iranians)	Census of India	1678	
Ossets	Pittard	1680	
Armenians	Chantre	1685	1529
Kurds	Tschepourkowsky	1686	
Ossets	Riskine	1690	1573
Kurds	Pittard	1701	
Sikhs	Census of India	1709	
Rajputs	" " "	1749	
Malays (Sumatra)	Kleiweg de Swaan and Mass	1755	
	Africa		
Mawambi pygmies	Czekanowski	1408	1356
Lukumba-Kumba pygmies	"	1414	
Bushmen	Fritsch, von Luschan and Pock	1440	
Ba-Binga	Poutrin	1510	1450
Ba-Tua	"	1522	1437
Ba Tschua	Starr	1542	1437
Kung Bushmen	Seiner	1564	1482
Kagoro	Tremearne	1600	
Dschagga	Widemann	1625	
Niam-Niam	Tucker and Myers	1627	
Yoruba	Deniker	1630	1561
Mandscha	Hösemann	1631	1557
Duala	von Luschan	1633	
Ewe	Deniker	1637	1574
Egyptians	Hrdlička	1638	
Yakoma	Girard	1640	
Kuari and Miusa	Hösemann	1646	
Furawi	Tucker and Myers	1653	
Fiot	Poutrin	1657	
Banda	"	1660	1530
Togo	von Luschan	1661	

Race	*Author*	♂	♀
Suaheli	von Luschan	1669	
M'Baka	Poutrin	1671	1568
Bedjah	Chantre	1676	
Berbers (Algeria)	Deniker	1680	
Negroes	Gould	1681	
Betschuans	Fritsch	1684	
South African Bastards	Fischer	1684	1570
Bugu	Girard	1687	
Aschanti	Deniker	1693	1554
Fans	Poutrin	1698	
Mandingo	Deniker	1705	
Bornus	Tucker and Myers	1710	
Bantus	Fritsch	1718	
Dinkas	Tucker and Myers	1727	1572
Nubians	Tucker and Seligmann	1735	1572
Massia	von Luschan and Widemann	1747	
Lobi	Ruelle	1754	1659
Buchuma	Poutrin	1755	1620
Kabba	"	1770	
Dinkas	Mochi	1773	1657
Schilluks	Tucker and Myers	1777	
Baghirmi and Wadai	" " "	1780	
Dinkas	" " "	1800	
Saras	Poutrin	1817	1676
	America		
Polar Eskimos	Steensby	1570	1454
Karibs from Guiana and Venezuela	Deniker	1572	
Labrador Eskimos	Boas	1575	1480
Terra del Fuegians	Hyades and Deniker	1577	1473
Eskimos	Duckworth	1577	1497
Tupi	Deniker	1588	
Juki (Central America)	Boas	1590	1488
Otomi	Hrdlička	1593	1474
Trumai	Ranke	1595	1487
Chileans	Outes	1603	
Bakairi	Ehrenreich	1608	1516
Aztecs	Hrdlička	1610	1489
Salishans (Harrison Lake)	Boas	1613	
Salishans	"	1618	
Zuñi	"	1623	1511
Greenland Eskimos	Deniker	1621	
Chiriguano	Lehmann-Nitschi	1634	1517

Race	*Author*	♂	♀
Mataco	Lehmann-Nitschi	1638	1529
Hopi Pueblos	Hrdlička	1638	1507
Kwakiutl Indians	Boas	1639	
Maidu (California)	"	1644	1533
Pueblos	Hrdlička	1645	1523
Alaska Eskimos	Boas	1658	1551
Shoshoni Indians	"	1661	1528
Bella Coola Indians	Deniker	1661	
Southern Utes	Hrdlička	1668	1537
Tshimshian Indians	Deniker	1666	
Shuswap Indians	Hrdlička	1673	1557
Eastern Cherokees	Boas	1677	1549
Chinook Indians	"	1691	
Apaches	Hrdlička	1691	1568
Toba Guaicuru	Lehmann-Nitschi	1698	1555
Southern Californian Indians	Boas	1700	1580
Navajo Indians	Hrdlička	1713	1573
Pima Indians	"	1718	1574
Eastern Ojibways	Boas	1723	1574
Sioux	"	1726	1595
Iroquois	"	1727	1585
Ona	Lehmann-Nitschi	1736	1596
Bororó	Ehrenreich	1737	1606
Maricopa	Hrdlička	1749	1604
Patagonians	Moreno and Lister	1750	
	Oceanic Islands		
Tapiro people	Wollaston	1449	
Pygmies from Kaiser Wilhelmsland	Neuhauss	1460	1380
Pygmies from Goliathberg	Van den Broek	1492	
Toricelligebirge people	Schlaginhaufen	1519	
Kai (New Guinea)	Pöch	1525	1435
Poum people	Schellong	1543	1498
New Mecklenburgers	Schlaginhaufen	1574	
Jakumul (N. New Guinea)	"	1583	
Arup " " "	"	1600	
Jabim people	Schellong	1606	1530
Solomon Islanders	Deniker	1616	
Australians and New South Wales	Schlaginhaufen	1636	
Tanga Islanders	"	1651	1540
Merauké	Koch	1672	1567
Central Australians	Deniker	1670	

Race	*Author*	♂	♀
Fak-Fak	Koch	1677	
Maoris	Deniker	1680	
Motu-Motu (New Guinea)	Chalmers	1702	
Samoans	Deniker	1726	
Tahitans, Pomotu Islanders, Tubuai Islanders	"	1733	
Marquesas Islanders	"	1743	

TABLE 25.

Height of Tragus.

Class	*Frequency*
1380 to 1399.99 mm.	2
1400	2
1420	6
1440	7
1460	11
1480	9
1500	19
1520	19
1540	10
1560	7
1580	4
1600	2
1620	2
	100

The mean is 1510.00 mm.
The extremes are 1393 mm.
1627 mm.
The standard deviation is 52.00 mm.
The coefficient of variation is 3.42
The index of height of tragus to total height is *92.0*

TABLE 26.

HEIGHT OF VERTEBRA PROMINENS.

Class	*Frequency*
1260 to 1279.99 mm.	1
1280	2
1300	4
1320	6
1340	7
1360	11
1380	15
1400	19
1420	16
1440	11
1460	4
1480	1
1500	3
	100

The mean is 1399.59 mm.
The extremes are 1274 mm.
1515 mm.
The standard deviation is 49.00 mm.
The coefficient of variation is 3.50
The index of height of vertebra prominens to total height is *85.5*

TABLE 27.

HEIGHT OF INCISURA STERNI.

Class	*Frequency*
1200 to 1219.99 mm.	1
1220	2
1240	4
1260	3
1280	6
1300	15
1320	15
1340	13
1360	22
1380	7
1400	10
1420	1
1440	1
	100

The mean is 1342.19 mm.
The extremes are 1213 mm.
1450 mm.
The standard deviation is 47.6 mm.
The coefficient of variation is 3.54
The index of height of incisura to total height is *81.7*

TABLE 28.

DISTANCE FROM HEIGHT OF VERTEX TO HEIGHT OF VERTEBRA PROMINENS.

Standing		Sitting	
Class	*Frequency*	*Class*	*Frequency*
210 to 214.99 mm.	6	210 to 214.99 mm.	3
215	2	215	1
220	6	220	9
225	12	225	11
230	21	230	16
235	12	235	16
240	11	240	14
245	7	245	20
250	14	250	5
255	2	255	3
260	5	260	2
265	2		100
	100		
The mean is 238.04 mm.		The mean is 237.84 mm.	
The extremes are 210 mm.		The extremes are 210 mm.	
266 mm.		264 mm.	
The standard deviation is 13.20 mm.		The standard deviation is 10.80 mm.	
The coefficient of variation is 5.55		The coefficient of variation is 4.55	

TABLE 28a.

COMPARISON OF THE ABOVE MEASUREMENTS: STANDING AND SITTING.

Class	*Frequency*	
−20 to −15.01 mm.	3	The mean is .39 mm. shorter in the sitting measurements. In subtraction of the averages this difference is .20 mm.
−15	3	
−10	20	
− 5 to 0	24	The extremes are −17 mm.
0 to 4.99 mm.	24	21 mm.
5	15	This distance is somewhat shorter in sitting. This may be due to the fact that the spine is pushed up slightly by the pressure exerted upon it by the sitting posture.
10	6	
15	4	
20	1	
	100	

TABLE 29.

DISTANCE FROM HEIGHT OF TRAGUS TO HEIGHT OF VERTEBRA PROMINENS.

Class	*Frequency*
80 to 81.99 mm.	1
82	0
84	1
86	1
88	2
90	4
92	0
94	3
96	4
98	6
100	2
102	7
104	8
106	4
108	4
110	5
112	6
114	3
116	7
118	7
120	5
122	10
124	5
126	1
128	1
130	1
132	2
	100

The mean is 110.55 mm.
The extremes are 81 mm.
132 mm.
The standard deviation is 11.88 mm.
The coefficient of variation is 10.75

TABLE 30.

DISTANCE FROM HEIGHT OF VERTEBRA PROMINENS TO HEIGHT OF ACROMION.

Standing		Sitting	
Class	*Frequency*	*Class*	*Frequency*
30 to 34.99 mm.	1	30 to 34.99 mm.	1
35	0	35	0
40	2	40	1
45	4	45	0
50	3	50	3
55	2	55	5
60	8	60	5
65	12	65	8
70	12	70	5
75	17	75	11
80	12	80	21
85	9	85	13
90	5	90	12
95	7	95	5
100	4	100	3
105	0	105	4
110	1	110	2
115	1	115	0
		120	1
	100		100
The mean is 75.94 mm.		The mean is 81.19 mm.	
The extremes are 34 mm.		The extremes are 33 mm.	
116 mm.		123 mm.	
The standard deviation is 15.65 mm.		The standard deviation is 15.00 mm.	
The coefficient of variation is 20.40		The coefficient of variation is 18.50	

TABLE 30a.

COMPARISON OF THE ABOVE MEASUREMENTS: STANDING AND SITTING.

Class	*Frequency*	
−25 to −20.01 mm.	1	
−20	2	
−15	3	The mean is 4.69 mm. longer in sitting than in standing. In the subtraction of averages this difference is 5.25 mm.
−10	11	
− 5 to 0	14	
0 to 4.99 mm.	25	The extremes are −23 mm.
+ 5	14	+31 mm.
+10	12	
+15	13	This difference is probably due to the slight shortening up of the spine and to the dropping of the shoulders when sitting.
+20	3	
+25	1	
+30	1	
	100	

TABLE 31.

DISTANCE FROM VERTEX TO INCISURA STERNI.

Standing		Sitting	
Class	*Frequency*	*Class*	*Frequency*
270 to 274.99 mm.	1	265 to 269.99 mm.	1
275	8	270	4
280	13	275	1
85	8	280	5
90	14	285	5
95	25	290	18
300	7	295	21
305	10	300	16
310	6	305	9
315	3	310	10
320	4	315	6
325	0	320	2
330	1	325	2
	100		100
The mean is 296.09 mm.		The mean is 299.74 mm.	
The extremes are 273 mm. 333 mm.		The extremes are 267 mm. 325 mm.	
The standard deviation is 12.40 mm.		The standard deviation is 11.75 mm.	
The coefficient of variation is 4.20		The coefficient of variation is 3.95	

The distance is 3.65 mm. longer sitting than standing.

All the distances taken between vertex, tragus or vertebra prominens on the one hand and incisura or acromion on the other are actually greater when the subject is in the sitting position. As it is evident that the relative positions of the three first of these points do not change very much in different positions of the body, the difference must be due largely to a drop of the shoulders and the thoracic cage when sitting. In the data presented by Fräulein Teumin the relative position of acromion in regard to incisura is higher in the sitting subject, perhaps because in her treatment the arms may have been supported in some way. Relatively to the vertebra prominens the incisura and acromion are lower in the sitting subject.

TABLE 32.

DISTANCE FROM HEIGHT OF VERTEBRA PROMINENS TO HEIGHT OF INCISURA STERNI.

Standing		Sitting	
Class	*Frequency*	*Class*	*Frequency*
20 to 24.99 mm.	1	20 to 24.99 mm.	1
25	1	25	0
30	1	30	0
35	2	35	0
40	5	40	3
45	10	45	6
50	17	50	18
55	19	55	14
60	14	60	12
65	11	65	16
70	8	70	13
75	5	75	9
80	6	80	7
	100	85	1
			100
The mean is 57.59 mm.		The mean is 63.19 mm.	
The extremes are 21 mm. 82 mm.		The extremes are 23 mm. 86 mm.	
The standard deviation is 12.10 mm.		The standard deviation is 11.35 mm.	
The coefficient of variation is 21.00		The coefficient of variation is 18.00	

TABLE 33.

DISTANCE FROM HEIGHT OF TRAGUS TO HEIGHT OF INCISURA STERNI.
(Subject standing.)

Class	*Frequency*
130 to 134.99 mm.	1
135	0
140	1
145	2
150	7
155	9
160	20
165	13
170	20
175	9
180	9
185	5
190	2
195	2
	100

The mean is 168.89 mm.
The extremes are 130 mm.
196 mm.
The standard deviation is 12.30 mm.
The coefficient of variation is 7.30

TABLE 34.

DISTANCE FROM HEIGHT OF INCISURA STERNI TO HEIGHT OF ACROMION.

Standing		Sitting	
Class	*Frequency*	*Class*	*Frequency*
−10 to −5.01 mm.	1	−10 to −5.01 mm.	2
− 5 to 0 mm.	5	− 5 to 0 mm.	5
0 to 4.99 mm.	9	0 to 4.99 mm.	12
5	16	5	9
10	16	10	11
15	9	15	14
20	12	20	19
25	14	25	14
30	9	30	5
35	4	35	5
40	4	40	3
45	0	45	0
50	1	50	1
	100		100
The mean is 17.99 mm.		The mean is 18.89 mm.	
The extremes are −5 mm.		The extremes are −8 mm.	
51 mm.		53 mm.	
The standard deviation is 12.45 mm.		The standard deviation is 11.90 mm.	
The coefficient of variation is 69.00		The coefficient of variation is 63.00	
The incisura is higher in 92 cases		The incisura is higher in 89 cases	
The acromium is higher in 6 cases		The acromium is higher in 7 cases	
The height is the same in 2 cases		The height is the same in 4 cases	

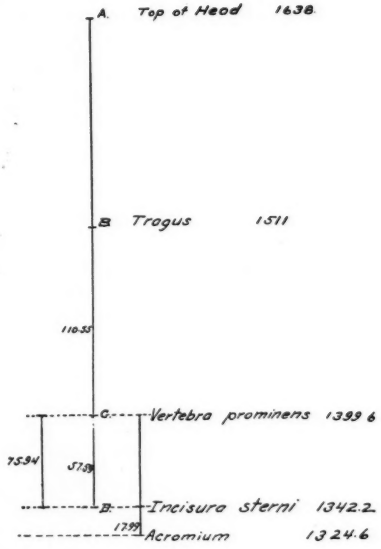


Chart showing relationships of Tragus, Vertebra prominens, Incisura sterni and Acromium.

A-D = 296.09
A-C. = 238.04
B-D = 168.9

FIGURE 22.

TABLE 35.

HEIGHT OF NIPPLE.

Class	*Frequency*
1060 to 1069.99 mm.	1
1070	0
1080	0
1090	0
1100	1
1110	2
1120	1
1130	2
1140	2
1150	1
1160	6
1170	3
1180	6
1190	9
1200	5
1210	5
1220	7
1230	8
1240	5
1250	1
1260	2
1270	2
1280	1
	70

The mean is 1198.79 mm.
The extremes are 1064 mm.
1280 mm.
The standard deviation is 43.20 mm.
The coefficient of variation is 3.60

TABLE 36.

INDEX OF HEIGHT OF NIPPLE TO TOTAL HEIGHT.

Class	*Frequency*
70 to 70.49	1
70.5	1
71.0	1
71.5	1
72.0	9
72.5	12
73.0	14
73.5	8
74.0	10
74.5	8
75.0	2
75.5	3
	70

The mean is 73.34
The extremes are 70.00
75.70
The standard deviation is 3.59
The coefficient of variation is 4.90

TABLE 37.

HEIGHT OF UMBILICUS.

Class	*Frequency*
880 to 899.99 mm.	3
900	5
920	8
940	11
960	15
980	17
1000	17
1020	15
1040	7
1060	1
1080	1
	100

The mean is 986.19 mm.
The extremes are 881 mm.
1080 mm.
The standard deviation is 42.80 mm.
The coefficient of variation is 4.34

TABLE 38.

INDEX OF HEIGHT OF UMBILICUS TO TOTAL HEIGHT.

Class	*Frequency*
55.5 to 55.99	1
56.0	0
56.5	0
57.0	0
57.5	3
58.0	5
58.5	9
59.0	12
59.5	12
60.0	16
60.5	8
61.0	11
61.5	11
62.0	4
62.5	3
63.0	1
63.5	0
64.0	1
64.5	1
65.0	1
65.5	0
66.0	1
	100

The mean is 60.41
The extremes are 55.59
66.10
The standard deviation is 6.58
The coefficient of variation is 10.80

RESULTS OF OTHER AUTHORS: HEIGHT OF UMBILICUS.

Europe

Race	*Author*	Absolute height	Index to total height ♂	♀
English students	Martin	.. ..	57.7	..
Parisians	"	.. ..	58.9	..
French	"	.. ..	59.7	..
Belgians	"	.. ..	60.4	..
French Normans	"	.. ..	60.9	..
Russians	Teumin	.. ..	..	59.0
Poles	Elkind	.. ..	56.8	..

Race	Author	Absolute Height		Index to total height ♂	♀
		Asia			
Jews	Jakowenka	..	..	59.48	..
Cossacks (Kirghiz)	Giltschenko	..	..	60.0	..
" "	Charusin	..	..	58.68	..
Ainu	Koganei	..	862	..	58.7
Japanese, thin	Bälz	..	897	..	59.6
" medium	"	..	870	..	59.1
" fat	"	..	848	..	58.7
Jakuts	Brodsky	..	889	..	59.6
Tunguses	"	..	854	..	58.4
Volga Kalmucks	Deniker	..	..	58.74	..
" "	Metschnikoff	..	..	60.04	..
Persians	Iwanowsky	..	..	59.25	..
Chinese	Martin	..	..	59.76	..
Torgouten	Iwanowsky	..	..	59.25	..
Formosans	Martin	..	..	59.3	..
Chinese	"	..	..	59.7	..
Anamites	"	..	..	..	57.6
Cambodians	"	..	..	..	59.3
		Africa			
Ba-Binga	Martin	..	..	58.5	59.3
Kabyles	"	..	..	59.4	..
Ba-Tua	"	..	..	59.7	59.9
Bushmen	"	..	..	60.0	60.5
Dschagga	"	..	..	60.6	..
Sudanese	"	..	..	60.9	61.2
M'Baka	"	..	..	60.9	61.3
Arabians	"	..	..	61.9	..
Massai	"	..	..	61.9	..
		Oceanic Islands			
Australians	Martin	..	..	59.3	..
Goliathberg Pygmies	"	..	..	59.6	..
		America			
Colorado Indians	Martin	..	..	57.9	58.4

The index of the height of the umbilicus is larger in the American women than in most of the other people measured. All the Europeans

with the exception of the Belgians and the Norman French and the Cossacks have an index less than 60.0. The Asiatic peoples have an index less than 60.0, but the African tribes are over 60.0 and more like the Americans. However, we think that this measurement might be influenced largely by the physical condition of the subjects.

TABLE 39.

HEIGHT OF ANTERIOR VENTRAL SPINE OF ILIUM.

Class	*Frequency*	
800 to 819.99 mm.	1	
820	3	
840	3	The mean is 926.79 mm.
860	6	The extremes are 811 mm.
880	11	1013 mm.
900	20	The standard deviation is 43.20 mm.
920	17	The coefficient of variation is 4.67
940	17	The index of height of spine to total height is *56.5*
960	10	
980	8	
1000	4	
	100	

RESULTS OF OTHER AUTHORS: HEIGHT OF ANTERIOR VENTRAL SPINE OF ILIUM.

		Index to total height	
Race	*Author*	♂	♀
Jakuts	Mainoff	53.34	
North Tunguses	"	55.00	55.55
Jakuts	Hecker	53.69	
Jakuts	Brodsky		55.4
Tunguses	"		55.8
Kuldscha (Kirghiz)	Iwanowsky	55.79	
Chinese	"	55.81	
Buku Cossacks	Charusin	56.04	
South Tunguses	Mainoff	56.18	56.3
Kuldscha Torgouts	Iwanowsky	56.86	
Telents	"	58.27	

TABLE 40.

HEIGHT OF SYMPHYSIS PUBIS.

Class	*Frequency*
720 to 739.99 mm.	1
740	1
760	9
780	7
800	14
820	19
840	18
860	14
880	10
900	3
920	3
940	1
	100

The mean is 839.0 mm.
The extremes are 737 mm.
942 mm.
The standard deviation is 43.20 mm.
The coefficient of variation is 5.15
The index of height of symphysis to total height is *51.2*

Results of Other Authors.

The relative symphysial height, that is, the index between the symphysial and total height, is shown by Martin in its racial variations in a table compiled from various authors. Data concerning females are rare, mainly gathered by Teumin, Koganei, and Jochelson-Brodsky. The more important are the following.

Race	♂	♀
Europe		
Englishmen	49.9	
Lapps	50.0	
Poles	50.7	
Belgians	50.7	
French	52.2	
Polish Jews		50.9
Asia		
Samoyedes	48.6	
Tungus and Yukagir		49.5
Japanese	49.0	48.4
Ainu	49.9	49.7
Kalmucks (Volga)	49.9	
Kalmucks	50.1	
Yakuts		50.3
Tatars	50.7	50.6
Anamites	51.2	
Africa		
Mawambi Pigmies	49.8	
Babinga	49.8	48.4
M'Baka	51.1	51.9
Bushmen	52.9	53.1
America		
Whites (U. S. Marines)	50.3	
U. S. Negroes	51.8	

TABLE 41.

Trunk Length.

(Tragus to symphysis pubis.)

Class	*Frequency*
590 to 599.99 mm.	1
600	1
610	2
620	7
630	4
640	13
650	9
660	12
670	12
680	8
690	13
700	7
710	3
720	6
730	1
740	1
	100

The mean is 671.29 mm.
The extremes are 597 mm.
742 mm.
The standard deviation is 31.30 mm.
The coefficient of variation is 4.55
The index of trunk length to total height is *41.0*

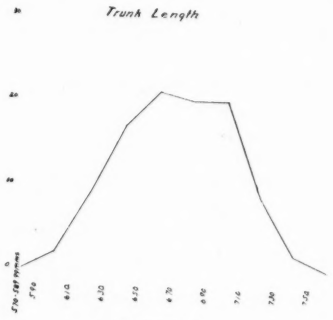


FIGURE 23.

This measurement, the distance from the tragus to the symphysis pubis, is the one used here in all tables in which a comparison is made with the trunk length. All such indices are based on this distance used as 100.

Perhaps a somewhat better trunk length is the sitting height of the suprasternale, Table 59, p. 529. The top of the table is at the plane of the sciatic tubers and furnishes the lower limit.

TABLE 42.

INDEX OF TRUNK LENGTH TO TOTAL HEIGHT.

Class	*Frequency*
36.00 to 36.99	2
37	2
38	6
39	17
40	18
41	21
42	23
43	7
44	4
	100

The mean is 41.10
The extremes are 36.60
44.50
The standard deviation is 1.70
The coefficient of variation is 4.15

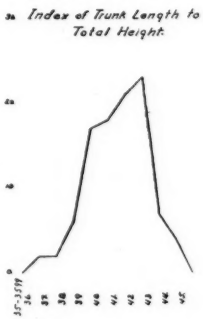


FIGURE 24.

TABLE 43.

DISTANCE FROM INCISURA STERNI TO SYMPHYSIS.

Class	*Frequency*
430 to 434.99 mm.	2
435	1
440	0
445	1
450	0
455	2
460	1
465	3
470	3
475	6
480	8
485	4
490	5
495	4
500	8
505	8
510	9
515	6
520	4
525	6
530	4
535	7
540	3
545	1
550	2
555	2
	100

The mean is 503.99 mm.
The extremes are 431 mm.
556 mm.
The standard deviation is 28.25 mm.
The coefficient of variation is 5.67
The index of this distance to total height is *30.7*

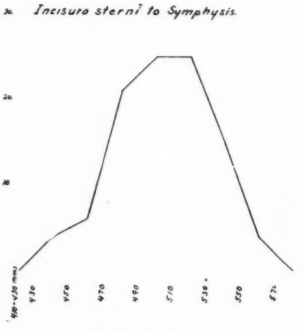


FIGURE 25.

TABLE 44.

INDEX OF THIS LATTER DISTANCE TO TOTAL HEIGHT.

Class	*Frequency*
26.0 to 26.49	1
26.5	0
27.0	1
27.5	1
28.0	4
28.5	5
29.0	8
29.5	7
30.0	13
30.5	13
31.0	15
31.5	8
32.0	16
32.5	3
33.0	2
33.5	2
34.0	1
	100

The mean is 30.78
The extremes are 26.00
34.10
The standard deviation is 1.48
The coefficient of variation is 4.80

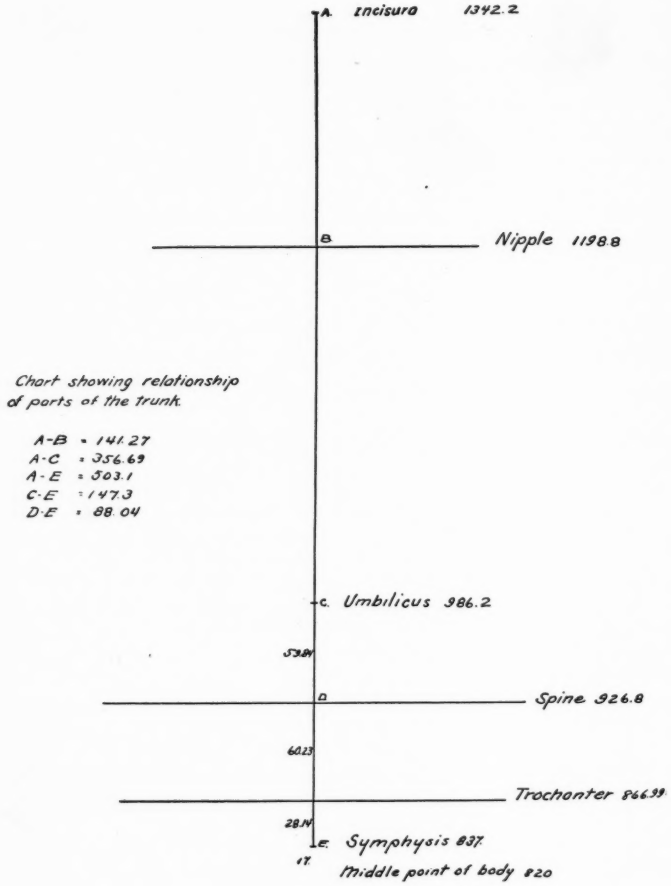

A. Incisura 1342.2
B Nipple 1198.8
Chart showing relationship of parts of the trunk.
A-B = 141.27
A-C = 356.69
A-E = 503.1
C-E = 147.3
D-E = 88.04
C. Umbilicus 986.2
539.8
D Spine 926.8
60.13
Trochanter 866.99
28.14
E. Symphysis 837.
17.
Middle point of body 820

FIGURE 26.

TABLE 45.

DISTANCE FROM HEIGHT OF INCISURA STERNI TO HEIGHT OF NIPPLE.

Class	*Frequency*
100 to 104.99 mm.	0
105	1
110	2
115	4
120	4
125	6
130	6
135	12
140	11
145	9
150	4
155	3
160	2
165	3
170	2
175	0
180	0
185	0
190	0
195	0
200	1
	70

The mean is 141.27 mm.
The extremes are 105 mm.
201 mm.
The standard deviation is 16.20 mm.
The coefficient of variation is 11.50
The distance as obtained by the subtraction of averages is 143.40 mm.
The index of this distance to distance from symphysis to nipple is *39.0*

TABLE 46.

DISTANCE FROM HEIGHT OF NIPPLE TO HEIGHT OF SYMPHYSIS.

Class	*Frequency*
300 to 304.99 mm.	1
305	0
310	1
315	1
320	2
325	2
330	1
335	1
340	6
345	6
350	5
355	5
360	7
365	7
370	5
375	5
380	2
385	1
390	4
395	3
400	2
405	2
410	1
	70

The mean is 362.60 mm.
The extremes are 301 mm.
411 mm.
The standard deviation is 24.40 mm.
The coefficient of variation is 6.72
The index of this distance to trunk length is *54.2*

TABLE 47.

INDEX OF THIS LATTER DISTANCE TO DISTANCE FROM INCISURA STERNI TO SYMPHYSIS.

Class	*Frequency*
67.00 to 67.49	1
67.5	2
68.0	4
68.5	2
69.0	1
69.5	5
70.0	2
70.5	4
71.0	9
71.5	5
72.0	4
72.5	4
73.0	3
73.5	5
74.0	7
74.5	3
75.0	2
75.5	0
76.0	4
76.5	0
77.0	1
77.5	1
78.0	1
	70

The mean is 72.35
The extremes are 67.10
78.20
The standard deviation is 2.57
The coefficient of variation is 3.50

TABLE 48.

DISTANCE FROM UMBILICUS TO SYMPHYSIS.

Class	*Frequency*
90 to 94.99 mm.	1
95	0
100	1
105	2
110	0
115	6
120	3
125	8
130	4
135	9
140	13
145	5
150	12
155	6
160	10
165	8
170	4
175	3
180	5
	100

The mean is 147.30 mm.
The extremes are 90.00 mm.
180.00 mm.
The standard deviation is 21.20 mm.
The coefficient of variation is 14.46
The index of this distance to distance from symphysis to incisura (averages) is *29.4*
The index of this distance to distance from incisura to umbilicus is *41.3*

TABLE 49.

INDEX OF THIS LATTER DISTANCE TO DISTANCE FROM INCISURA STERNI TO SYMPHYSIS.

Class	*Frequency*
20 to 20.99	1
21	2
22	2
23	2
24	8
25	9
26	8
27	8
28	11
29	7
30	6
31	13
32	10
33	7
34	0
35	4
36	0
37	2
	100

The mean is 28.93
The extremes are 20.20
37.10
The standard deviation is 3.58
The coefficient of variation is 12.03

TABLE 50.

DISTANCE FROM INCISURA TO UMBILICUS.

Class	*Frequency*
295 to 299.99 mm.	1
300	0
305	0
310	1
315	1
320	1
325	7
330	9
335	5
340	10
345	5
350	7
355	8
360	9
365	6
370	9
375	5
380	5
385	2
390	4
395	1
400	3
405	1
	100

The mean is 356.69 mm.
The extremes are 295 mm.
405 mm.
The standard deviation is 22.00 mm.
The coefficient of variation is 6.20
The index of this distance to distance from the symphysis to incisura is *7 1.6*

TABLE 51.

HEIGHT OF MID-POINT OF BODY.

(When standing erect.)

Class	*Frequency*
750 to 759.99 mm.	1
760	1
770	7
780	8
790	5
800	10
810	15
820	13
830	13
840	17
850	2
860	4
870	3
880	1
	100

The mean is 820 mm.
The extremes are 750 mm.
880 mm.
The standard deviation is 27.40 mm.
The coefficient of variation is 3.34

The average height of the symphysis is 839 mm. This average is 19 mm. higher than that of the middle point of the body.

The symphysis is higher in	72%
The middle point is higher in	23%
They are equal in	5%
Total	100%

TABLE 52.

DIFFERENCE BETWEEN HEIGHT OF UMBILICUS AND MID-POINT OF BODY.
(The umbilicus is always higher than this middle point.)

Class	*Frequency*
120 to 124.99 mm.	1
125	4
130	6
135	6
140	7
145	4
150	10
155	5
160	7
165	12
170	6
175	8
180	6
185	5
190	2
195	3
200	6
205	1
210	1
	100

The mean is 163.99 mm.
The extremes are 122 mm.
211 mm.
The standard deviation is 21.80 mm.
The coefficient of variation is 13.30

TABLE 53.

DISTANCE FROM HEIGHT OF UMBILICUS TO HEIGHT OF ANTERIOR VENTRAL SPINE OF ILIUM.

Class	*Frequency*
15 to 19.99 mm.	1
20	0
25	2
30	8
35	7
40	5
45	6
50	9
55	10
60	13
65	10
70	8
75	13
80	2
85	3
90	1
95	1
100	1
	100

The mean is 59.84 mm.
The extremes are 16 mm.
100 mm.
The standard deviation is 17.90 mm.
The coefficient of variation is 30.00.
The distance obtained by the subtraction of averages is 59.40 mm.

TABLE 54.

DISTANCE FROM HEIGHT OF ANTERIOR VENTRAL SPINE OF ILIUM TO HEIGHT OF SYMPHYSIS.

Class	*Frequency*
35 to 39.99 mm.	1
40	1
45	0
50	1
55	6
60	5
65	3
70	9
75	8
80	7
85	9
90	12
95	12
100	8
105	6
110	5
115	3
120	2
125	0
130	1
135	1
	100

The mean is 88.04 mm.
The extremes are 35 mm.
137 mm.
The standard deviation is 20.30 mm.
The coefficient of variation is 23.05
The distance obtained by the subtraction of averages is 87.79 mm.

TABLE 55.

DISTANCE FROM HEIGHT OF TROCHANTER TO HEIGHT OF SYMPHYSIS.

Class	*Frequency*	
− 5 to 0.0 mm.	1	
0.0 to 5.0	2	
5	8	
10	8	The mean is 28.14 mm.
15	8	The extremes are − 5 mm.
20	15	56 mm.
25	13	The standard deviation is 15.00 mm.
30	14	The coefficient of variation is 53.30
35	7	The distance obtained by the subtraction of average heights is 27.99 mm.
40	7	
45	4	
50	6	
55	2	
	95	

The trochanter is higher than the symphysis in 92 cases.
The symphysis is higher than the trochanter in 1 case.
The height is equal in 2 cases.
In all, 95 cases.

TABLE 56.

DISTANCE FROM HEIGHT OF ANTERIOR VENTRAL SPINE OF ILIUM TO HEIGHT OF TROCHANTER.

Class	*Frequency*	
10 to 19.99 mm.	1	
20	2	
30	5	
40	13	The mean is 60.23 mm.
50	23	The extremes are 11 mm.
60	30	110 mm.
70	4	The standard deviation is 17.50 mm.
80	7	The coefficient of variation is 29.05
90	5	
100	3	
110	1	
	94	

Checks to Certain of the Preceding Tables.

The average measurements of distances between two levels (or "Heights") may be found, as in many of the preceding tables, by obtaining the individual distances by subtraction and then averaging these, or by obtaining the averages of certain heights, and subtracting these. Thus, in the first instance below, the distance from umbilicus to symphysis was first found in each of the 95 subjects from whom the data were obtained, and these gave a *mean distance* of 147.30 mm. (p. 516). This distance was again obtained by subtracting the average height of the symphysis, taken from the 95 individual heights, from a similar average for the height of the umbilicus, and this method gave 147.19 mm. The disparity, .11 mm., is negligible and proves the correctness of the general method. In the other cases given, the results are also nearly coincident, and furnish a satisfactory proof of the work. The results, as shown in a few of the preceding tables, are as follows:

Measurement	(1) By averaging individual distances obtained by subtracting heights	(2) By subtracting average heights
		986.19
		839.00
Umbilicus to symphysis	147.30	147.19
		986.19
		926.79
Umbilicus to anterior spine of ilium	59.84	59.40
		926.79
		866.99
Anterior spine to trochanter	60.23	59.80
		866.99
		839.00
Trochanter to symphysis	28.14	27.99

Again, certain of the results given here, representing the components of a larger distance, may be added together and the result compared with those for the distance of which they are the components. Thus, the distance umbilicus–symphysis is made up of the three distances umbilicus–ant. spine; ant. spine–trochanter, and trochanter–symphysis, and the sum of the results of the last three practically equals the result from the entire distance.

Umbilicus–ant. spine	59.84	59.40
Ant. spine–trochanter	60.23	59.80
Trochanter–symphysis	28.14	27.99
Umbilicus–symphysis	148.21	147.19

By using the distance ant. spine–symphysis, instead of its two components, we add to the 59.84 (umbilicus–ant. spine) the mean, 88.04, which gives 147.88. In the same way the distance ant. spine–symphysis may be broken up into ant. spine–trochanter, and trochanter–symphysis, and using these independent results we get 60.23 + 28.14 = 88.37.

Other similar results that concern distances between levels, such as those that involve vertex, tragus, incisura, acromion, and nipple, may be tested in the same way.

TABLE 57.

TOTAL SITTING HEIGHT.

Class	*Frequency*
810 to 819.99 mm.	1
820	8
830	12
840	16
850	11
860	13
870	8
880	12
890	9
900	5
910	2
920	1
930	1
940	0
950	1
	100

The mean is 864.49 mm.
The extremes are 811 mm.
952 mm.
The standard deviation is 27.90 mm.
The coefficient of variation is 3.23
The index of the total sitting height to the total height is *52.7*

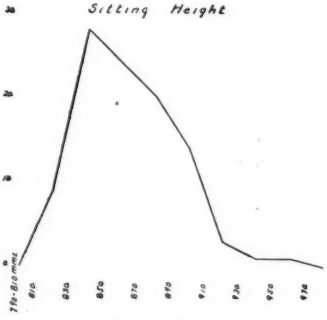


FIGURE 27.

RESULTS OF OTHER AUTHORS: INDEX OF SITTING HEIGHT TO TOTAL HEIGHT.

From Martin.

Race	*Author*	♂	♀
		Europe	
Ukrainian Jews		51.4	
Russian Jews	Blechmann	51.6	
Letts		51.9	
French		51.9	53.6
Lithuanians		52.1	
Belgians		52.2	53.4
Norman French		52.3	
English		52.4	
Livonians and Ests		52.5	
Albanians		52.6	
Balkan Tatars		52.6	53.5
Swedes		52.9	
Norwegians		53.0	
Russian Jews	Weissenberg	53.0	
Great Russians		53.0	53.2
		Asia	
Malser		50.8	
Cambodians			51.7
Anamites			51.9
Toda		51.5	
Kurumbar		51.6	
Brahmans		51.8	
Sudra		52.1	
Lolo		52.7	
Kalmucks		52.7	52.7
Jakuts		53.0	
Thibetans		53.2	54.3
South Chinese		53.2	
Setchuan Chinese		53.6	
Armenians		53.6	
North Chinese		53.7	
Kubu		53.9	54.0
Formosans		54.0	
Ainu		54.8	54.6
		Africa	
Massai		48.9	
Bushmen		49.5	50.5

Race	*Author*	♂	♀
Bugu		49.8	
M'Baka		50.4	50.6
Dschagga		50.5	
Somali		51.0	
Suaheli		51.0	
Jakoma		51.2	
Fans		51.3	50.4
Egyptians		51.3	
Kabyles		51.4	
Fiot		51.5	
Ba-Tua		51.8	52.5
Togo		51.9	
Duala		52.2	
Mawambi Pygmies		52.3	50.7
Kagoro		53.8	
Ba-Binga		54.0	53.2
	Oceanic Islands		
Australia		46.5	48.4
	America		
Trumai		50.6	51.1
Auetö		51.4	51.3
Eskimos		51.4	53.2
Nahuqua		51.8	52.2
Shoshoni		52.2	52.7
Polar Eskimos		52.5	53.7
Pima		52.9	
Apaches		53.2	
Koukpagmiut Eskimos		53.5	

In general this index is larger in the female than in the male, the legs of the male being longer and increasing the total height without a correspondingly large increase in the length of the body. In general too this index is larger in the shorter peoples as their bodies are longer in proportion. Curiously, though, the Mawambi pygmies have not a very large index and it is smaller in the female. The index of the women of the United States (52.7) is less than that of any of the Europeans measured and less than the Asiatic races. It is closer to the index of some of the African tribes and North American Indians.

TABLE 58.

HEIGHT OF VERTEBRA PROMINENS.

(Subject sitting.)

Class	*Frequency*
580 to 589.99 mm.	5
590	6
600	13
610	11
620	26
630	15
640	11
650	3
660	5
670	2
680	1
690	0
700	1
710	1
	100

The mean is 626.89 mm.
The extremes are 580 mm.
711 mm.
The standard deviation is 24.40 mm.
The coefficient of variation is 3.89
The index of height of vertebra prominens to total sitting height is *72.5*

TABLE 59.

HEIGHT OF INCISURA STERNI.

(Subject sitting.)

Class	*Frequency*
510 to 519.99 mm.	0
520	5
530	9
540	14
550	20
560	16
570	10
580	13
590	6
600	4
610	1
620	2
	100

The mean is 564.19 mm.
The extremes are 521 mm.
626 mm.
The standard deviation is 21.60 mm.
The coefficient of variation is 3.83
The index of height of incisura to total height is *65.2*

This measurement, the sitting height of the suprasternale, is often used as the trunk height. The principal objection to this is that it does not include the neck, as is done if the tragus be taken as the upper limit. Cf. p. 508, Table 41.

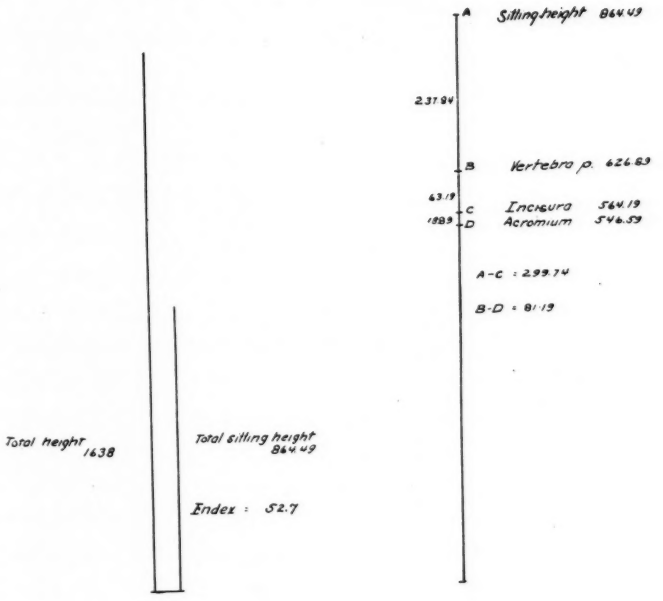
TABLE 60.

HEIGHT OF ACROMION.

(Subject sitting.)

Class	*Frequency*
500 to 509.99 mm.	3
510	9
520	17
530	15
540	14
550	15
560	12
570	6
580	5
590	3
600	0
610	0
620	1
	100

The mean is 546.59 mm.
The extremes are 500 mm.
629 mm.
The standard deviation is 23.10 mm.
The coefficient of variation is 4.23
The index of height of acromium to total height is *33.3*



SITTING POSITIONS.

FIGURE 28.*

* The scale of the right-hand diagram of Figure 28 is twice that of the left-hand half.

III. Arm Measurements.

TABLE 61.

Height of Acromion.

Class	*Frequency*
1200 to 1219.99 mm.	1
1220	4
1240	6
1260	5
1280	11
1300	16
1320	18
1340	17
1360	14
1380	3
1400	3
1420	2
	100

The mean is 1324.59 mm.
The extremes are 1207 mm.
1425 mm.
The standard deviation is 50.60 mm.
The coefficient of variation is 3.74
The index of height of acromion to total height is *81.0*

TABLE 62.

Height of Head of Radius.

Class	*Frequency*
920 to 939.99 mm.	2
940	3
960	5
980	6
1000	19
1020	19
1040	19
1060	12
1080	10
1100	4
1120	1
	100

The mean is 1035.2 mm.
The extremes are 924 mm.
1124 mm.
The standard deviation is 41.00 mm.
The coefficient of variation is 3.96
The index of height of olecranon to total height is *63.2*

TABLE 63.

HEIGHT OF STYLOID PROCESS OF RADIUS.

Class	*Frequency*
690 to 699.99 mm.	1
700	0
710	1
720	2
730	3
740	5
750	7
760	6
770	7
780	12
790	15
800	12
810	5
820	11
830	9
840	3
850	1
	100

The mean is 790.49 mm.
The extremes are 693 mm.
857 mm.
The standard deviation is 33.00 mm.
The coefficient of variation is 4.17
The index of height of styloid process to total height is *48.3*

TABLE 64.

Height of Tip of Middle Finger.

Class	*Frequency*
540 to 549.99 mm.	1
550	0
560	9
570	4
580	6
590	9
600	14
610	14
620	16
630	11
640	5
650	4
660	6
670	0
680	1
	100

The mean is 613.79 mm.
The extremes are 547 mm.
681 mm.
The standard deviation is 28.40 mm.
The coefficient of variation is 4.65
The index of height of middle finger to total height is *37.5*

TABLE 65.

LENGTH OF ARM.

(Acromion to tip of middle finger.)

Class	*Frequency*
640 to 649.99 mm.	4
650	1
660	9
670	8
680	7
690	6
700	14
710	18
720	12
730	9
740	3
750	4
760	3
770	1
780	0
790	1
	100

The mean is 707.49 mm.
The extremes are 640 mm.
792 mm.
The standard deviation is 33.60 mm.
The coefficient of variation is 4.75
The index of length of arm to length of the leg is *81.5*

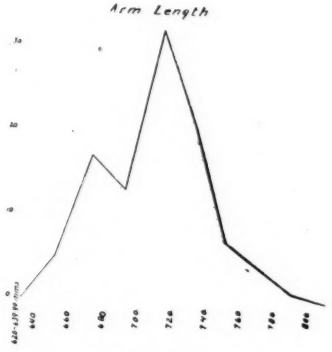


FIGURE 29.

TABLE 66.

INDEX OF ARM LENGTH TO TOTAL HEIGHT.

Class	*Frequency*
39.5 to 39.99	1
40.0	1
40.5	1
41.0	5
41.5	8
42.0	11
42.5	14
43.0	14
43.5	14
44.0	12
44.5	12
45.0	5
45.5	1
46.0	0
46.5	1
	100

The mean is 43.29
The extremes are 39.5
46.6
The standard deviation is 1.14
The coefficient of variation is 2.64

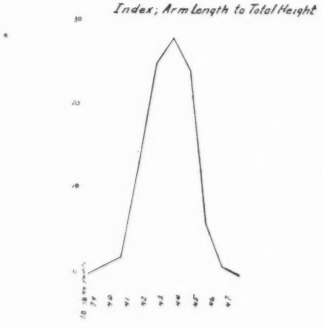


FIGURE 30.

TABLE 67.

INDEX OF ARM LENGTH TO TRUNK LENGTH.

Class	*Frequency*
92 to 92.99	1
94	1
96	5
98	7
100	16
102	9
104	14
106	10
108	12
110	8
112	8
114	3
116	3
118	1
120	2
	100

The mean is 106.03
The extremes are 92.1
121
The standard deviation is 6.62
The coefficient of variation is 6.25

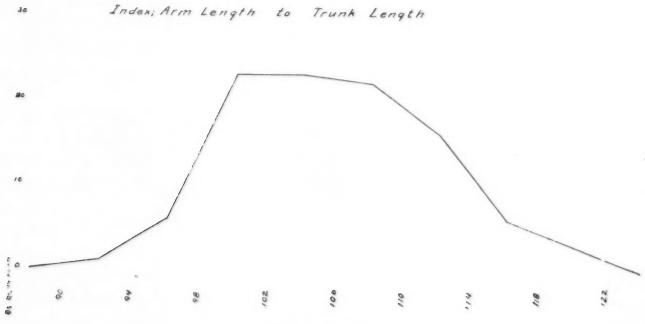


FIGURE 31.

RESULTS OF OTHER AUTHORS: INDEX OF ARM LENGTH TO TOTAL HEIGHT. Compiled from data of Brodsky, Martin and Teumin.

Europe

Race	*Author*	♂	♀
Europeans	Quetelet	44.2	
Herzogovinians	Martin	44.1	
French Normans	"	44.7	
French	"	44.8	44.5
Czechs	"	45.0	
People of Baden	"	45.1	
Jews	Blechmann	45.2	
"	Weissenberg	45.2	
"	Jakowenko	44.7	
Russian Jews	Martin	45.1	44.1
Letts	"	44.9	44.4
Livonians	"	45.4	
Polish Jews	"	45.5	43.5
Belgians	"	45.5	44.2
Poles	Elkind	45.6	
Lapps	Iwanowsky	45.95	
Armenians	Martin	45.8	
Galicians	"	46.0	
Gypsies	"	46.0	
Jews	Weisbach	46.0	
Great Russians	Martin	46.4	43.7
Little Russians	Diebold	46.6	
Magyars	Martin	46.7	
Alsatians	"	46.8	
Lithuanians	Brenson		46.7
Russians	Teumin		42.0
Little Russian Jews	"		43.0
Polish Jews	"		42.0

Asia

Anamites	Martin		43.2
South Chinese	"		44.6
Cambodians	"		44.7
Kuldscha (Chinese)	Iwanowsky	44.4	
Zirjans	Martin	43.1	
Toala	"	43.2	
Japanese	"	43.2	
Senoi	"	43.6	42.9
Lolo	"	43.7	

Race	*Author*	♂	♀
Igorotes	Martin	43.8	
Cochin Chinese	"	43.9	41.2
Badaga	"	44.2	
Kubu	"	44.4	43.4
South Tunguses	Mainoff	44.4	44.1
Kalmucks	Martin	44.4	43.6
Menangkabau Malays	"	44.5	
Tonkinese	"	44.5	
Buriats	Korotoff	44.54	44.19
Cossacks (Kirghiz)	Iwanowsky	44.52	45.12
Orotsches	Margaritoff	44.84	
Ossets	Giltschenko	44.19	
"	Martin	44.9	44.3
Kayan	"	45.0	
Kitai	"	45.0	
Baschkirs	"	45.0	
Moi	"	45.1	
North Chinese	"	45.2	
Tatars	Iwanowsky	44.88	
Ostjaks	"	44.98	
Samoyedes	"	45.29	44.95
Kara Kirghiz	"	45.31	44.62
Bontoc Igorotes	Martin	45.2	42.7
Kurds	"	45.3	45.1
Javanese	"	45.4	
Torgouts	Iwanowsky	45.8	
Battaks	Martin	45.8	44.2
Telengets	"	46.0	
North Tunguses	Mainoff	45.75	44.97
Transbaikal Tunguses	Iwanowsky	45.81	
Astrakhan Kalmucks	"	45.96	
Ainu	Koganei	45.98	45.1
Jakuts	Mainoff	46.1	45.70
Tamils	Martin	46.3	
Chinese Setchuan	"	46.4	
Sikhs	"	46.6	
Bashkirs	Iwanowsky	46.09	
Tatars	Martin	46.9	44.6
Veddahs	"	47.0	
Persians	"	48.3	
Japanese, medium	Bälz		42.9
" delicate	"		43.9
Tunguses	Brodsky		44.5
Jakuts	"		44.6

Race	*Author*	♂	♀
Sojots	Gorostschenko		45.06
	Africa		
Amhara Abyssinians	Martin	44.5	
Mawambi Pygmies	"	44.8	46.6
Somali	"	45.0	
Kongo Negroes	"	45.0	
Baamba	"	45.2	
Bangambo	"	45.2	
Ba-Tua	"	45.3	45.8
M'Baka	"	45.6	44.9
Dahome Negroes	"	45.6	
Suaheli	"	45.6	
Togo	"	45.9	
Bushmen	"	46.0	45.5
Fiot	"	46.0	
Fans	"	46.2	
Jakoma	"	46.6	
Duala	"	46.7	
Ba-Binga	"	47.2	46.3
Lobi	"	47.4	46.9
Bugu	"	47.7	
	Oceanic Islands		
Micronesians	Martin	45.1	
New Mecklenbergers	"	45.1	
Solomon Islanders	"	45.5	
Samoans	"	45.7	
Buka	"	46.3	
Papuans	"	46.5	
Australians	"	47.0	
New Caledonians	"	47.2	
Goliathberg Pygmies	"	48.5	
	America		
Toba	Martin	43.4	
Koukpagmiut Eskimos	"	44.0	42.7
Nunatagmiut Eskimos	"	44.1	42.6
Matakis	"	44.1	
Athabascan Indians	Loucheux	44.4	42.7
Indians (Harrison Lake)	Boas	44.45	44.43
Vancouver Islanders	Martin	44.87	
Athabascan Indians	Boas	44.9	43.0
Shoshoni Indians	Martin	44.6	44.1

Race	*Author*	♂	♀
Bella Coola Indians	Boas	45.04	44.4
Iroquois	Martin	45.1	
Terra del Fuegians	"	45.6	
Karaja	"	45.8	
Botokudes	"	46.3	44.3

In general the Asiatic and African women have a larger index than the European. The index of the women of the United States is approximately that of the Europeans. The women of the American Indian races also have a larger index than these. In practically every case this index is larger in the male than in the female.

RESULTS OF OTHER AUTHORS: INTERMEMBRAL INDEX.

Race	*Author*	♂	♀
People of Baden		73.2	67.9
Veddahs		67.1	
Malayans (Asia)		69.1	64.4
Tamils		70.1	
Igorotes		70.0	
Menangkabau Malays		70.2	
Sikhs		70.8	
South Chinese		71.6	
Javanese		72.2	
Battaks		73.3	
Merauké		70.9	71.7
Jabim Islanders		71.0	
New Mecklenbergers		71.0	69.5
Buka		72.2	
Brazilian Indians		74.4	74.9

This index is the relation of the humerus + the radius to the femur + the tibia. The figures are from Martin.

This is larger than the Asiatics and very much smaller than the Oceanic Islanders, or the Brazilian Indians. Except in the latter this index is smaller in females than in males.

Our determination of this index for the women of the United States is 67.6, approximately that of the women of Baden.

TABLE 68.

ARM STRETCH.

Class	*Frequency*
1500 to 1519.99 mm.	2
1520	0
1540	6
1560	9
1580	6
1600	10
1620	11
1640	16
1660	13
1680	7
1700	6
1720	5
1740	4
1760	4
1780	1
	100

The mean is 1647.4 mm.
The extremes are 1509 mm.
1792 mm.
The standard deviation is 59.00 mm.
The coefficient of variation is 3.58

TABLE 69.

INDEX OF ARM STRETCH TO TOTAL HEIGHT.

Class	*Frequency*
95.5 to 95.99	1
96.0	1
96.5	1
97.0	4
97.5	9
98.0	4
98.5	7
99.0	6
99.5	9
100.0	6
100.5	3
101.0	12
101.5	7
102.0	8
102.5	3
103.0	8
103.5	4
104.0	4
104.5	1
105.0	2
	100

The mean is 101.00
The extremes are 95.51
105.00
The standard deviation is 2.22
The coefficient of variation is 2.20

RESULTS OF OTHER AUTHORS: INDEX OF ARM STRETCH TO TOTAL HEIGHT.

Europe

Race	*Author*	♂	♀
Jews	Blechmann	103.3	
Albanians	Martin	101.6	
Russians	Teumin		100
Jews (Polish, Russian)	"		100
Great Russians	Martin	103.6	103.4
People of Baden	"		103.4
Jews	Weissenberg	103	
"	Giltschenko	103.4	
Norwegians	Martin	103.7	
South Russian Jews	"	103.8	102.9
Jews	Jakowenko	104.0	
Swedes	Martin	104.0	
French	Collignon	104.4	
Livonians	Martin	104.5	
Gypsies	"	104.6	
Lithuanians	Baronas	104.7	104.6
Belgians	Martin	104.8	101.6
French	Godin	106.1	
Lithuanians	Waeber	106.6	
Ests	Martin	108.0	
European women	Ricardo		101.5

Asia

Lolo	Martin	99.1	
North Chinese	"	102.1	
Chinese	"	102.1	101.5
Japanese	"	102.6	100.5
Perak Malays	"	102.8	
South Chinese	Girard	102.9	
Senoi	Martin	103.0	102.6
Formosans	"	103.7	
Koreans	"	104.0	
Toda	"	104.1	
Brahmans	"	104.4	
Payaks	"	104.5	
Thibetans	"	104.7	
Buriats	"	104.8	
Jakuts	Brodsky		104.0
Tunguses	"		103.5
Menangkabau Malays	Martin	104.9	

Race	*Author*	♂	♀
Tatars	Martin	105.0	103.0
Ainu	Koganei	105.9	104.9
Kurumbar	Martin	106.3	
Irular	"	106.3	
Kadir	"	107.0	
Anamites	"		101.9
Cambodians	"		104.5
	Africa		
Kabyles	Martin	101.5	
Bushmen	"	102.1	100.8
Somali	"	103.2	
Fiot	"	104.0	
Ba-Binga	"	104.0	107.2
Ba-Tua	"	104.0	102.3
M'Baka	"	105.0	104.1
Massai	"	105.0	
Batanga	"	105.0	
Fans	"	105.0	105.0
Mawambi Pygmies	"	105.2	107.3
Jakoma	"	105.6	
Togo	"	105.9	
Lobi	"	105.9	104.5
Bugu	"	106.2	
Duala	"	108.0	
Dschagga	"	108.6	106.4
	Oceanic Islands		
Goliathberg Pygmies	Martin	104.4	
Australians	"	104.9	
Merauké	"	106.5	104.8
Jakumul (New Guinea)	"	106.9	
Arup " "	"	108.8	
	America		
Polar Eskimos	Martin	99.3	97.9
Colorado Indians	"	100.7	
Terra del Fuegians	"	101.4	
Koukpagmiut Eskimos	Boas	102.5	100.3
Nunatagmiut Eskimos	"	103.1	102.4
Thaltan Indians	"	103.5	101.0
Indians (Harrison Lake)	"	104.6	104.1
Shoshoni Indians	Martin	104.3	

Race	*Author*	♂	♀
Brazilian Indians	Martin	104.5	103.2
Bororó	"	104.7	
Nahuqua	"	105.0	104.7
Trumai	"	105.3	104.6
Auetö	"	106.1	105.1
Iroquois Indians	"	108.9	

This index is smaller in the female than in the male. It is smaller in women of the United States than in the Asiatic or African women; and is almost exactly equal to the general average for European women given by Ricardo.

TABLE 70.

LENGTH OF HUMERUS.

Class	*Frequency*	
250 to 254.99 mm.	4	
255	3	
260	8	
265	8	
270	7	The mean is 286.74 mm.
275	7	The extremes are 252 mm.
280	11	332 mm.
285	10	The standard deviation is 18.20 mm.
290	11	The coefficient of variation is 6.35
295	12	The index of humerus to total height is *17.5*
300	5	The index of humerus to arm length is *40.53*
305	3	The index of length of humerus to length of the femur is *63.3*
310	6	
315	1	
320	2	
325	1	
330	1	
	100	

TABLE 71.

INDEX OF HUMERUS LENGTH TO TRUNK LENGTH.

Class	*Frequency*	
35 to 35.99	1	
36	1	
37	2	
38	3	
39	12	
40	13	The mean is 42.76
41	11	The extremes are 35.6
42	13	52.1
43	11	The standard deviation is 3.05
44	7	The coefficient of variation is 7.13
45	11	The index of length of humerus to length of
46	9	femur is *63.3*
47	2	
48	1	
49	1	
50	1	
51	0	
52	1	
	100	

RESULTS OF OTHER AUTHORS: INDEX OF HUMERUS LENGTH TO TOTAL HEIGHT.
Compiled from data of Brodsky, Martin and Teumin.

Europe

Race	*Author*	♂	♀
French	Martin	18.9	
Austrian Jews	Weisbach	17.90	
Germans	Martin	19.0	18.8
Norman French	"	19.4	
People of Baden	"	19.8	19.1
Jews	Jakowenko	19.04	19.23
Lithuanians	Brenson		19.4
Polish Jews	Teumin		19
Little Russian Jews	"		19.3
Russians	"		19
Jews	Blechmann	19.8	

Race	*Author*	♂	♀
White Russians	Eichholz	19.39	
Little Russians	Diebold	20.4	
	Asia		
Tonkinese	Martin	17.5	
Lolo	"	17.7	
Buriats	"	17.8	
Senoi	"	18.1	18.0
Japanese, heavy	Bälz		18.3
" light	"		18.4
Menangkabau Malays	Martin	18.3	
Javanese	"	18.3	
Igorotes	"	18.7	
Tengereses	"	19.2	
Jakuts	Brodsky		19
Tunguses	"		19
Kubu	Martin	18.8	18.0
South Chinese	"	19.2	
Bontoc Igorotes	"	19.2	18.5
Ainu	Koganei	19.3	17.7
Veddahs	Martin	19.4	
Tamils	"	19.5	
Malays	"	19.5	
Kalmucks	"	19.9	
Sikhs	"	20.1	
	Africa		
Kongo Negroes	Martin	18.0	19.2
Lobi	"	18.4	18.4
Fiot	"	18.5	
Jakoma	"	18.5	
Fans	"	18.6	18.9
Mawambi Pygmies	"	19.1	19.2
M'Baka	"	19.5	19.1
Ba-Tua	"	19.5	19.7
Bushmen	"	19.6	18.9
Ba-Binga	"	20.2	20.0
Hottentots	"	21.9(?)	
	Oceanic Islands		
New Mecklenbergers	Martin	19.2	
	America		
Colorado Indians	Martin	18.5	
Terra del Fuegians	"	19.2	19.7

Race	*Author*	♂	♀
Brazilian Indians	Martin	19.6	19.2
Patagonians	"	20.9	

This index is shorter in the women of the United States than in any others except the Japanese. It is about the same in the two sexes.

RESULTS OF OTHER AUTHORS: FEMORO-HUMERAL INDEX.

From Martin.

Race	*Author*	♂	♀
	Europe		
Bajuvars	Martin	71.0	73.1
German Swiss	"	71.1	70.9
Tyroleans	"	71.6	70.4
Europeans	Broca	72.5	71.9
Italians	Martin	72.9	72.1
Russians	Teumin		67.5
Polish Jews	"		67.5
Little Russian Jews	"		69
Little Russians	Diebold	68.7	68.7
Torgouts	Iwanowsky	75.6	72.6
	America		
Terra del Fuegians	Martin	69.8	
Lower Californians	"	70.6	71.1
Paltacalo Indians	"	72.0	73.2
Salado Indians	"	72.6	72.2
	Asia		
Andaman Islanders	Flower	68.8	
Senoi	Martin	69.9	
Hindus	Turner	70.5	
Veddahs	Martin	71.2	68.1
Ainu	"	72.4	71.7
	Africa		
Negroes	Broca	69.8	68.8
Bushmen	Schrubsell	70.0	
Massai	Martin	71.0	
Egyptians	Naqada	71.0	70.1
Negroes	Humphrey	71.2	
"	Turner	71.6	
Fiot	Martin	72.6	
	Oceanic Islands		
Australians	Turner	71.4	

TABLE 72.

LENGTH OF RADIUS.

Class	*Frequency*
210 to 214.99 mm.	1
215	1
220	5
225	11
230	12
235	12
240	16
245	8
250	9
255	7
260	5
265	4
270	1
275	2
280	4
285	2
	100

The mean is 245.24 mm.
The extremes are 211 mm.
289 mm.
The standard deviation is 16.60 mm.
The coefficient of variation is 6.77
The index of length of radius to total height is *14.9*
The index of length of radius to arm length is *34.8*
The index of length of radius to length of humerus is *85.5*
The index of length of radius to length of tibia is *73.4*

TABLE 73.

INDEX OF RADIUS LENGTH TO TRUNK LENGTH.

Class	*Frequency*
31 to 31.99	4
32	4
33	7
34	20
35	12
36	11
37	11
38	6
39	12
40	5
41	2
42	5
43	1
	100

The mean is 36.66
The extremes are 31.3
43.0
The standard deviation is 2.89
The coefficient of variation is 7.90

RESULTS OF OTHER AUTHORS: INDEX OF RADIUS LENGTH TO TOTAL HEIGHT.

Race	*Author*	♂	♀
	Europe		
Jews	Weisbach	16	
Parisians	Martin	14.3	
Belgians	"	14.4	13.9
Polish Jews	"	14.9	14.4
People of Baden	"	15.5	14.4
Germans	"	15.9	
Little Russian Jews	Teumin		14.0
Polish Jews	"		14.0
Russians	"		13.0
Jews	Martin	15.9	14.0
"	Jakowenko	16.07	
White Russians	Eichholz	16.59	
Little Russians	Diebold	19.91	
	Asia		
Burjats	Martin	13.7	
Senoi	"	13.8	13.9

Race	*Author*	♂	♀
Mongolian Torgouts	Iwanowsky	14.3	
Igorotes	Martin	14.5	
Kubu	"	14.6	14.4
South Chinese	"	14.8	
Tengereses	"	15.1	
Lolo	"	15.2	
Tamils	"	15.2	
Ainu	Koganei	15.3	15.0
Menangkabau Malays	Martin	15.4	
Kalmucks	"	16.2	16.5
Tonkinese	"	16.3	
Ossets	Giltschenko	16.52	
Kirghiz	"	16.6	
Japanese, heavy	Bälz		15.1
" medium	"		14.9
" light	"		14.8
Jakuts	Brodsky		14.2
Tunguses	"		14.2
	Africa		
Mawambi Pygmies	Martin	14.2	13.8
Ba-Tua	"	15.2	15.4
M'Baka	"	15.4	15.3
Bushmen	"	15.4	15.4
Ba-Binga	"	15.9	15.8
Fiot	"	16.2	
Fans	"	16.3	15.8
Jakoma	"	16.4	
Bugu	"	16.7	
Lobi	"	17.7	17.1
	America		
Colorado Indians	Martin	14.1	14.0
Botokudo	"	15.3	14.3
Terra del Fuegians	"	15.6	

This index in the women of the United States is slightly larger than in the Europeans, while the index of the humeral length is smaller. The lower arm is therefore longer in proportion. The radial index of the African tribes is longer than in the other races. There is no difference between the sexes in this measurement.

RESULTS OF OTHER AUTHORS: INDEX OF ARM LENGTH WITHOUT HAND TO TOTAL HEIGHT.

From Martin.

Race	♂	♀
People of Baden	35.4	33.6
French	35.0	34.1
Parisians	33.2	
Igorotes	33.3	
Menangkabau Malays	33.7	
Bontoc Igorotes	33.9	32.4
African Negroes	35.5	35.3
Lolo	32.5	
Fans	35.4	
Fiot	35.1	

This index in the women of the United States we have found to be 32.4

RESULTS OF OTHER AUTHORS: TIBIO-RADIAL INDEX.

From Martin.

Race		♂	♀
Parisians (St. Germains)	Martin	63.5	
" (St. Marcel)	"	64.6	66.2
Tyroleans	"	64.9	68.1
Australians	"	64.9	65.2
Negroes	"	65.4	65.7
Germans	"	66.0	68.7
Massai	"	66.1	62.2
Paltacalo Indians	"	66.1	66.8
Lower Californians	"	66.4	64.3
Veddahs	"	66.5	65.1
Ainu	"	67.7	66.2
Andamen Islanders	"	67.8	65.4
Bajuvars	"	68.1	68.4
Salado Indians	"	69.9	68.5
Terra del Fuegians	"	70.9	
Jews	Jakowenko	47.6	49
Little Russian Jews	Teumin		50
Polish Jews	"		48.5
Russians	"		50

The tibio-radial index for the women of the United States we have found to be 73.4.

TABLE 74.

Length of Hand.

Class	*Frequency*
130 to 134.99 mm.	1
135	0
140	1
145	0
150	4
155	5
160	7
165	15
170	18
175	8
180	11
185	8
190	6
195	7
200	5
205	1
210	1
215	1
220	1
	100

The mean is 177.64 mm.
The extremes are 130 mm.
220 mm.
The standard deviation is 15.90 mm.
The coefficient of variation is 9.00
The index of length of hand to total height is *10.85*
The index of length of hand to arm is *25.1*
The index of length of hand to length of foot is *73.6*

TABLE 75.

INDEX OF HAND LENGTH TO TRUNK LENGTH.

Class	*Frequency*
20 to 20.99	1
21	0
22	2
23	7
24	20
25	13
26	20
27	11
28	6
29	10
30	2
31	4
32	3
33	0
34	0
35	1
	100

The mean is 26.69
The extremes are 20.0
35.1
The standard deviation is 2.59
The coefficient of variation is 9.70

RESULTS OF OTHER AUTHORS: INDEX OF HAND LENGTH TO TOTAL HEIGHT.

From Martin

Europe

Race	*Author*	♂	♀
Little Russian Jews	Teumin		10
Polish Jews	"		10
Russians	"		10
Little Russians	Martin	10.9	
Polish Jews	"	10.9	10.9
White Russians	Eichholz	10.9	
Little Russians	Diedold	11.0	
Parisians	Martin	11.1	
Jews	"	11.1	11.2
French	Godin	11.2	
Jews	Weissenberg	11.2	
People of Baden	Martin	11.2	11.0
Belgians	"	11.3	11.3
Kirghiz	Giltschenko	11.3	
Norman French	Martin	11.4	
Jews	Blechmann	11.5	
"	Weisbach	11.8	
"	Jakowenko	11.13	11.24
Lithuanians	Martin	11.9	12.2
Lithuanians	Brenson		11.11

Asia

Lolo	Martin	9.8	
Kubu	"	9.8	
South Chinese	"	10.1	
Javanese	"	10.2	
Tamils	"	10.3	
Battaks	"	10.6	
Sikhs	"	10.7	
Tonkinese	"	10.7	
Menangkabau Malays	"	10.7	
Senoi	"	10.9	11.3
Jakuts	Brodsky		11.0
Kalmuks	Martin	11.1	11.0
Tunguses	Brodsky		11.2
Bontoc Igorotes	Martin	11.3	10.3
Veddahs	"	11.5	
Chinese	"	11.6	11.7
Ainu	Koganei	11.7	11.5

Race	*Author*	♂	♀
Japanese, coarse	Bälz		11.5
" medium	"		11.5
" delicate	"		11.6
Anamites	Martin	11.8	10.2
Cambodians	"	11.9	
	Africa		
Ba-Tua	Martin	10.5	10.8
M'Baka	"	10.8	10.5
Fiot	"	10.8	
Mawambi Pygmies	"	10.8	11.2
Bushmen	"	10.9	11.1
Massai	"	11.1	
Fans	"	11.2	11.2
Ba-Binga	"	11.4	11.0
Lobi	"	11.4	
Dschagga	"	11.4	11.0
Egyptians	"	11.6	
Jakom	"	11.7	
Bugu	"	11.8	
Kabyles	"	11.9	
	Oceanic Islands		
New Mecklenbergers	Martin	10.6	
Merauké	"	11.0	
	America		
Brazilian Indians	Martin	10.4	10.3
Galibi	"	10.5	
Botokudes	"	10.6	
North American Indians	"	11.0	
Terra del Fuegians	"	11.2	11.1

IV. Leg Measurements.

TABLE 76.

Length of Leg.
(Height of trochanter.)

Class	*Frequency*
760 to 779.99 mm.	2
780	1
800	9
820	11
840	20
860	18
880	21
900	12
920	3
940	2
960	0
980	1
	100

The mean is 866.99 mm.
The extremes are 763 mm.
980 mm.
The standard deviation is 38.6 mm.
The coefficient of variation is 4.42
The index of length of leg to total height is *53.0*

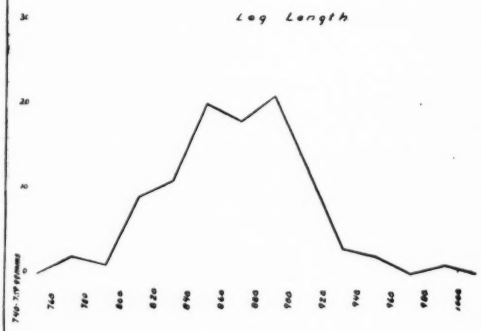


Figure 32.

TABLE 77.

INDEX OF LEG LENGTH TO TOTAL HEIGHT.

Class	*Frequency*
49.5 to 49.99	1
50.0	3
50.5	4
51.0	8
51.5	10
52.0	8
52.5	14
53.0	12
53.5	17
54.0	9
54.5	8
55.0	3
55.5	1
56.0	1
56.5	0
57.0	1
	100

The mean is 53.01
The extremes are 49.6
57.0
The standard deviation is 1.45
The coefficient of variation is 2.74

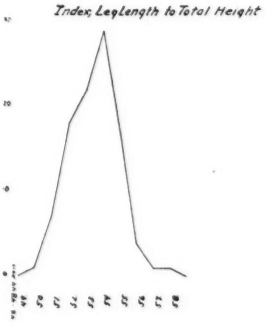


FIGURE 33.

TABLE 78.

INDEX OF LEG LENGTH TO TRUNK LENGTH.

Class	*Frequency*
110 to 111.99	1
112	0
114	0
116	5
118	7
120	8
122	6
124	8
126	7
128	11
130	10
132	9
134	8
136	7
138	4
140	2
142	3
144	1
146	1
148	0
150	1
152	0
154	1
	100

The mean is 128.60
The extremes are 111.0
154.1
The standard deviation is 8.08
The coefficient of variation is 6.30

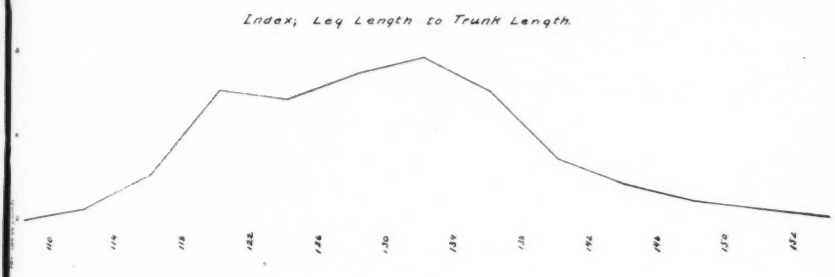


FIGURE 34.

It is interesting to note how much more variation there is in the index of length of the leg to the trunk length than to the total height. This corresponds almost exactly to the difference between the corresponding coefficients of variation of the indices of the arm lengths. The coefficient of variation of index of the arm length to the total height is 2.64; that of the leg 2.74.

The coefficient of variation of the index of the arm length to the trunk length is 6.25; that of the leg 6.30.

The correlation between the lengths of the arm and leg, and the total height is evidently much larger but there is a large amount of spuriousness in a correlation between the length of leg and total height.

RESULTS OF OTHER AUTHORS: INDEX OF LEG LENGTH TO TOTAL HEIGHT.

I. *Taking the symphysis as the upper limit of the leg.* (See index of the symphysis height to the total height.)

II. *Taking the height of the anterior ventral spine less 40 mm. as the upper limit of the leg.*

Race	*Author*	♂	♀
	Europe		
Lithuanians	Martin	50.7	50.2
Great Russians	"	51.1	50.6
Polish Jews	"	52.2	52.0
Swiss	Schaffhausen	53.3	
	Asia		
Japanese	Martin	48.5	49.0
Kalmucks	"	50.8	
Igorotes	"	51.6	50.5

Race	*Author*	♂	♀
Senoi	Martin	52.1	52.6
Anamites	"	52.2	
Tatars	"	52.3	51.3
Tengereses	"	52.8	
Moi	"	53.1	
Menangkabau Malays	"	53.6	
Jakuts	"	53.7	54.1
Sikhs	"	54.3	
Veddahs	"	54.8	
Jakuts	Brodsky		52.8
Tunguses	"		52.8
	Africa		
Jakoma	Martin	48.7	
Bugu	"	50.1	
Mawambi Pygmies	"	50.8	52.2
Kabyles	"	52.4	
Arabs	"	53.7	
	Oceanic Islands		
Merauké	Martin	55.7	
	America		
Eskimos	Martin	54.0	

III. *Taking the trochanter as the upper limit of the leg.*

	Europe		
White Russians	Martin	50.6	
Russian Jews	"	50.7	
Norman French	"	50.7	
French	Collignon	51.7	
Belgians	Martin	52.0	50.8
South Russian Jews	"	52.1	52.2
	Asia		
Japanese, medium	Bälz	48.5	49.0
" light	"	49.6	50.9
" heavy	"	50.0	49.2
Cochin Chinese	Martin	49.7	
Chinese	"	50.0	52.9
Anamites	"	50.2	51.3
Kubu	"	50.9	51.5
Zirjans	"	51.0	

Race	*Author*	♂	♀
Tatars	Martin	51.3	
Armenians	"	51.5	
Ainu	Koganei	51.5	50.6
"	Iwanowsky	50.80	50.59
Kirghiz	"	50.09	49.04
Kara Kirghiz	"	49.52	
Jakuts	Brodsky		49.7
Kuldscha Chinese	Iwanowsky	49.67	
Lapps	"	49.7	
Tunguses	Brodsky		50.0
Jukagirs	"		50.0
Torgouts	Iwanowsky	50.55	
Astrakhan Kalmucks	"	50.59	
Buriats	"	50.82	50.28
Battaks	Martin	51.7	
South Chinese	"	51.8	
Kasan Tatars	Iwanowsky	51.29	
Japanese	Soller	51.7	
Javanese	Martin	52.2	
Arabians	"	52.6	
Tamils	"	53.8	
Sikhs	"	54.3	
Cambodians	"		53.3
	Africa		
Hottentots	Martin	50.5	
Ba-Binga	"	52.3	52.0
Congo Negroes	"	52.6	
Egyptians	"	52.9	
Ba-Tua	"	53.0	53.0
Dahome	"	53.1	
Berbers	"	53.4	
Fiot	"	54.0	
M'Baka	"	54.1	52.8
Fans	"	54.5	55.1
Aschanti	"	54.8	
Kru	"	56.0	52.2
Lobi	"	56.5	58.5
	Oceanic Islands		
New Mecklenbergers	Martin	51.6	
Buka	"	51.7	
Merauké	"	52.1	

Race	*Author*	♂	♀
Papuans	Martin	52.2	
Australians	"	52.7	
	America		
Botokudo	Martin	49.8	50.0
Eskimos	"	50.7	
Terra del Fuegians	"	50.9	50.4
Colorado Indians	"	51.0	52.3
Bororó	"	51.2	
Arowaks	"	51.2	
Tupi	"	51.3	
Bella Coola	"	51.8	
Bakairi	"	52.0	
Omaha Indians	"	52.4	

In Group I, where the symphysis is taken as the upper limit, the legs of the United States women are a little longer than those of the Asiatic and European women. In the second group the United States women have a larger index than any of the Europeans or Asiatics with the exception of the Jakuts measured by Brodsky. The index of United States women, as measured here, is about equal to that of the African tribes. In the third group the index of the United States women is larger than that of the European and Asiatic women and more nearly equal to that of the African tribes.

As the index of the height of the symphysis is about equal in all races, the difference seems to lie in the relative heights of the trochanter and spine. In the Russian and Jewish women measured by Dr. Teumin the pelvis, from the data, appears to be flatter and more flaring than in the women from the United States. The index of the cristal breadth in the Russians is 17.8, while in the Americans it is 16.63. The proportion is more clearly shown by the biacromial-cristal index which is 83.0 in the Russians and only 77.3 in the Americans. The breadth between the spines of the ilia is about the same in relation to the total height, but is much larger in comparison with the cristal breadth, in the Americans. The cristal-spinal index of the Russians is 88 and that of the Americans 94.1. If this is true it appears that the shape of the American pelvis may be more like that of the Africans, deeper and not so broad, with the trochanter above the symphysis.

TABLE 79.

HEIGHT OF KNEE.

(Articulation of femur and tibia on inner side of leg.)

Class	*Frequency*
350 to 359.99 mm.	1
360	1
370	4
380	8
390	12
400	18
410	18
420	13
430	12
440	5
450	4
460	3
470	1
	100

The mean is 414.59 mm.
The extremes are 353 mm.
470 mm.
The standard deviation is 23.30 mm.
The coefficient of variation is 5.61
The index of height of knee to total height is *25.3*

TABLE 80.

HEIGHT OF INNER MALLEOLUS.

Class	*Frequency*
55 to 59.99 mm.	1
60	1
65	13
70	25
75	11
80	19
85	24
90	5
95	1
	100

The mean is 78.69 mm.
The extremes are 57 mm.
95 mm.
The standard deviation is 8.25 mm.
The coefficient of variation is 10.50
The index of height of inner malleolus to total height is *4.8*
The index of height of inner malleolus to length of leg is *9.1*
The index of height of inner malleolus to length of trunk is *11.7*

TABLE 81.

Length of Femur.

Class	*Frequency*
390 to 399.99 mm.	1
400	6
410	9
420	6
430	8
440	15
450	14
460	11
470	19
480	5
490	3
500	2
510	0
520	1
	100

The mean is 452.99 mm.
The extremes are 390 mm.
523 mm.
The standard deviation is 27.60 mm.
The coefficient of variation is 6.07
The index of length of femur to total height is *27.6*
The index of length of femur to length of leg is *52.3*

TABLE 82.

INDEX OF FEMUR LENGTH TO TRUNK LENGTH.

Class	*Frequency*
52 to 53.99	1
54	0
56	4
58	1
60	5
62	14
64	12
66	15
68	11
70	21
72	5
74	8
76	1
78	0
80	1
82	1
	100

The mean is 67.67
The extremes are 51.9
82.0
The standard deviation is 5.18
The coefficient of variation is 7.76

RESULTS OF OTHER AUTHORS: INDEX OF FEMUR LENGTH TO TOTAL HEIGHT.

I. *Taking the symphysis as the upper limit of the leg.*

Race	*Author*	♂	♀
Jews	Weisbach		23.7
Lithuanians	Brenson		29.43
Little Russian Jews	Teumin		27
Polish Jews	"		27
Russians	"		27
White Russians	Eichholz	25.08	
Ossets	Giltschenko	22.9	
Little Russians	Talko Grinzewitch	29.2	
" "	Diebold	30.30	
Ainu	Koganei		21.7

II. *Taking the spinal height less 40 mm. as the upper limit of the leg.*

Europe

Race	*Author*	♂	♀
People of Baden	Martin	27.1	28.4

Asia

Kalmucks	Martin	23.3	
Sikhs	"	26.0	
Senoi	"	26.3	25.6
Menangkabau Malays	"	26.5	
Veddahs	"	27.8	
Jakuts	Brodsky		26.6
Tunguses	"		27.1

Africa

Fiots	Martin	25.6	
Mawambi Pygmies	"	26.7	28.6
Fans	"	26.8	27.5
Bushmen	"	27.2	27.4
Lobi	"	29.9	30.8

III. *Taking the trochanter as the upper limit of the leg.*

Europe

Race	*Author*	♂	♀
French	Godin	25.4	
People of Baden	Martin	26.0	

Race	Author	♂	♀
	Asia		
Japanese, medium	Bälz	22.5	23.2
" light	"	23.3	24.2
" heavy	"	23.7	23.2
Kubu	Martin	24.2	24.5
Mongolian Torgouts	Iwanowsky	24.24	
Menangkabau Malays	"	24.5	
Battaks	"	24.6	
Javanese	"	24.6	
Igorotes	"	24.7	23.1
South Chinese	"	24.9	
Kling	"	25.8	
	Africa		
Jakoma	Iwanowsky	22.9	
Bugu	"	23.1	
Ba-Tua	"	25.8	25.9
Ba-Binga	"	25.9	24.7
M'Baka	"	26.2	25.4
	Oceanic Islands		
New Mecklenbergers	Iwanowsky	24.1	
Buka	"	24.2	
Jabim	"	25.0	
	America		
Colorado Indians	Martin	24.3	25.3

Compared with this last set of indices that of the United States women (27.6) is larger as in most of our subjects we found the trochanter to be above the symphysis. It was 60 mm. below the spine of the ilium so that there is only 20 mm. difference between the height of the trochanter and the height of the point defined by Martin as the upper limit of the leg, 40 mm. below the spine of the ilium. This index is more nearly like those in the first group where this point has been taken as the upper limit of the leg. In the first group there is a great deal of variation, the index of the United States women (25.7) being a little smaller than the average. In general this index seems to be a little larger in the female than in the male.

TABLE 83.

LENGTH OF TIBIA.

Class	*Frequency*
270 to 279.99 mm.	1
280	1
290	3
300	7
310	14
320	19
330	15
340	19
350	9
360	6
370	4
380	1
390	1
	100

The mean is 334.19 mm.
The extremes are 274 mm.
390 mm.
The standard deviation is 21.40 mm.
The coefficient of variation is 6.10
The index of length of tibia to total height is *20.4*
The index of length of tibia to length of the leg is *38.7*
The index of femur plus tibia to length of leg is *91.0*
The index of length of tibia to length of femur is *73.8*

TABLE 84.

INDEX OF TIBIA LENGTH TO TRUNK LENGTH.

Class	*Frequency*	
42 to 43.99	3	
44	12	
46	12	
48	22	The mean is 50.19
		The extremes are 42.1
50	22	59.0
		The standard deviation is 3.64
52	12	The coefficient of variation is 7.25
54	10	
56	6	
58	1	
	100	

RESULTS OF OTHER AUTHORS: INDEX OF TIBIA LENGTH TO TOTAL HEIGHT.

Race	*Author*	♂	♀
	Europe		
Jews	Jakowenko (to outer malleolus)	23.45	22.98
Little Russian Jews	Teumin		20
Polish Jews	"		20
Russian	"		20
White Russians	Eichholz	23.15	
People of Baden	Martin	22.4	21.2
French	Godin	22.6	
	Asia		
Mongolian Torgouts	Iwanowsky	20.39	
Japanese, medium	Bälz	21.2	23.8
" light	"	21.9	23.4
" heavy	"	22.0	22.5

Race	*Author*	♂	♀
Japanese	Martin	21.9	22.5
Javanese	"	22.8	
Battaks	"	23.0	
Toda	"	22.1	
Irular	"	22.2	
Brahmans	"	22.3	
Senoi	"	22.4	22.7
Menangkabau Malays	"	22.7	
Kalmucks	"	23.1	
Veddahs	"	23.3	
South Chinese	"	23.1	
Igorotes	"	23.4	
Sikhs	"	24.1	
Tamils	"	24.3	
Tunguses	Brodsky		20.3
Jakuts	"		20.9
	Africa		
Jakoma	Martin	21.8	
Ba-Binga	"	22.4	23.4
Mawambi Pygmies	"	22.7	23.4
Bugu	"	23.1	
Ba-Tua	"	23.4	
Bushmen	"	23.8	23.9
M'Baka	"	23 9	23.8
Lobi	"	25.7	25.2
Fans	"	27.4	27.2
Fiot	"	28.0	
	Oceanic Islands		
Buka	Martin	23.4	
New Mecklenbergers	"	23.5	
Jabim	"	24.0	
	America		
Colorado Indians	Martin	22.2	22.6

The index of the American women (20.4) is about the same as that of the Russian and Jewish women measured by Teumin and as that of the Jakut and Tungus women measured by Brodsky. It is smaller than the index of the rest of the Asiatic women. There seems to be no sexual difference.

RESULTS OF OTHER AUTHORS: INDEX OF TIBIA LENGTH TO FEMUR LENGTH

(Crural or Tibio-femoral Index.)

From Martin.

Race	*Author*	♂	♀
Tunguses	Brodsky		74.7
Jukagirs	"		74.7
Jakuts	"		77.6
Swiss	Aargau	84.2	
Bologna Italians	Peli	85.0	85.0
Menangkabau Malays	Martin	85.8	
People of Baden	"	86.5	75.0
Senoi	"	86.6	89.3
Malays (Sumatra)	"	87.0	
French	Papillaud	87.7	89.4
Setchuan Chinese	Martin	88.6	
Jews	Jakowenko	88.7	86.9
Little Russian Jews	Teumin		76.1
Polish Jews	"		72.2
Russians	"		76.1

In this set of data there are few cases in which both sexes of the same race were measured. In general this index seems much smaller in the female than in the male. It is hard to reach any definite conclusion as in four cases where both sexes are measured, the index is about equal, while in only one is it much smaller in the female.

TABLE 85.

LENGTH OF FOOT.

Class	*Frequency*
205 to 209.99 mm.	1
210	0
215	2
220	6
225	9
230	10
235	21
240	18
245	10
250	14
255	4
260	3
265	1
270	1
	100

The mean is 240.69 mm.
The extremes are 207 mm.
273 mm.
The standard deviation is 11.80 mm.
The coefficient of variation is 4.66
The index of foot length to total height is *15.1*
The index of foot length to length of leg is *24.1*
The index of hand length to foot length is *73.6*

TABLE 86.

INDEX OF FOOT LENGTH TO TRUNK LENGTH.

Class	*Frequency*
31 to 31.99	2
32	5
33	14
34	10
35	14
36	19
37	20
38	8
39	6
40	2
	100

The mean is 36.05
The extremes are 31.1
40.0
The standard deviation is 2.16
The coefficient of variation is 6.00

RESULTS OF OTHER AUTHORS: INDEX OF FOOT LENGTH TO TOTAL HEIGHT

Mainly from Martin.

Europe

Race	*Author*	♂	♀
Jews	Jakowenko	15.43	14.04
Lithuanians	Brenson		15.5
"	Martin	14.6	14.4
Little Russian Jews	Teumin		14
Polish Jews	"		14
Russians	"		15
Jews	Weisbach	15.06	
Little Russian Jews	Weissenberg	15.6	
Jews	Blechmann	15.5	
White Russians	Eichholz	15.5	
Letts	Martin	14.6	14.8
Parisians	"	14.8	
French Normans	"	15.6	
South Russian Jews	"	15.7	
Belgians	"	15.7	14.9
Jews	"	15.9	
People of Baden	"	16.0	15.5

Asia

Japanese, medium	Bälz	13.8	14.4
" thin	"	14.5	14.6
" heavy	"	14.6	15.6
Malser	Martin	15.0	
Setchuan Chinese	"	15.0	
Chinese	"	15.1	
Toda	"	15.2	
Irular	"	15.3	
Brahmans	"	15.4	
Javanese	"	15.4	
Siamese	"	15.5	
Battaks	"	15.5	
Sikhs	"	15.5	
Ainu	Koganei	15.5	14.8
Ajini	Anutschin	15.3	
Mongolian Torgouts	Iwanowsky	15.3	
Cambodians	Martin	15.5	
Senoi	"	15.6	
Tamils	Martin	15.8	

Race	*Author*	♂	♀
Anamites	Martin	15.0	
Tunguses	Brodsky		14.6
Jakuts	"		14.9
	Africa		
Bushmen	Martin	14.6	14.4
Suaheli	"	14.8	
Fiot	"	14.8	
Duala	"	15.0	
Fans	"	15.4	14.7
Bugu	"	15.4	
Togo	"	15.4	
Lobi	"	15.4	15.0
Massai	"	15.5	
Egyptians	"	15.5	
Ba-Tua	"	15.5	14.8
Ba-Binga	"	15.6	15.2
M'Baka	"	15.6	15.0
Dschagga	"	15.6	15.0
Mawambi Pygmies	"	15.6	15.5
Jakoma	"	15.6	
	Oceanic Islands		
Buka	Martin	15.9	
Merauké	"	15.9	
New Mecklenbergers	"	16.0	
	America		
Galibi	Martin	13.7	
Colorado Indians	"	15.0	14.5
Schingu Indians	"	15.1	
Brazilian Indians	"	15.2	14.8

The index of the United States women (15.1) is slightly larger than the majority of both European and Asiatic races. It is in general subject to but little variation.

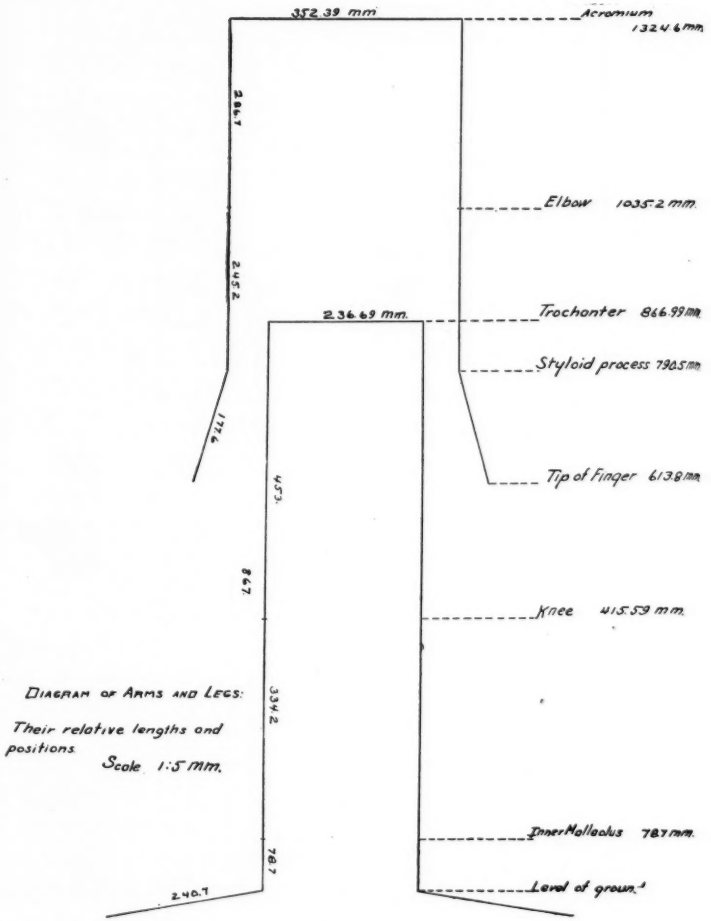

352.39 mm
Acromium
1324.6mm
Elbow 1035.2 mm.
Trochonter 866.99mm
Styloid process 790.5mm
Tip of Finger 613.8mm
236.69 mm.
Knee 415.59 mm.
Inner Malleolus 78.7mm.
Level of ground
DIAGRAM OF ARMS AND LEGS:
Their relative lengths and positions.
Scale 1:5 mm.

FIGURE 35.

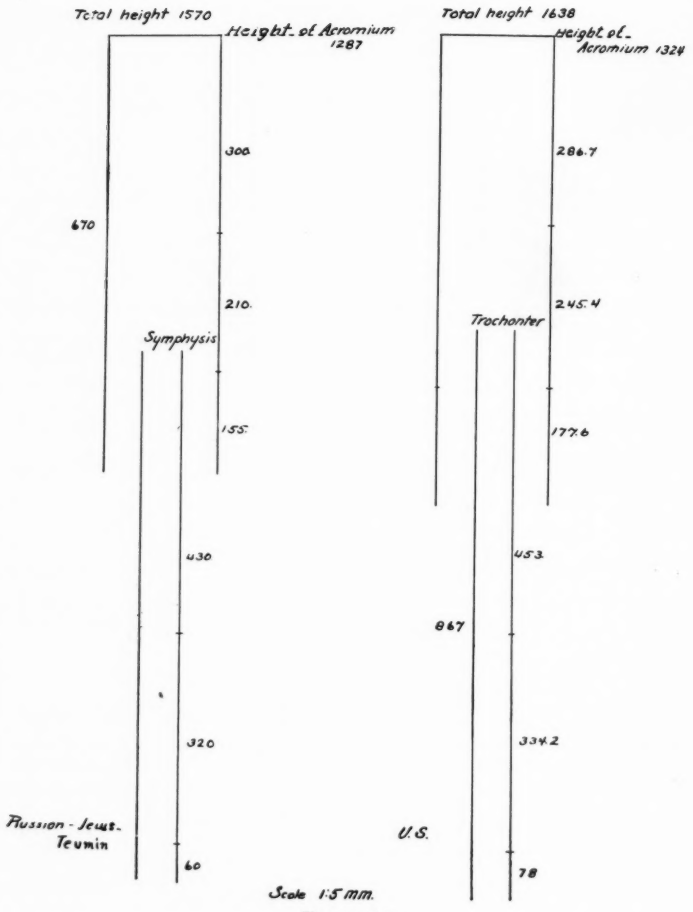

Total height 1570
Height of Acromium 1287
300
670
210
Symphysis
155
430
320
Russian - Jews. Teumin
60
Total height 1638
Height of Acromium 1324
286.7
245.4
Trochanter
177.6
453
867
334.2
U.S.
78
Scale 1:5 mm.

FIGURE 36.

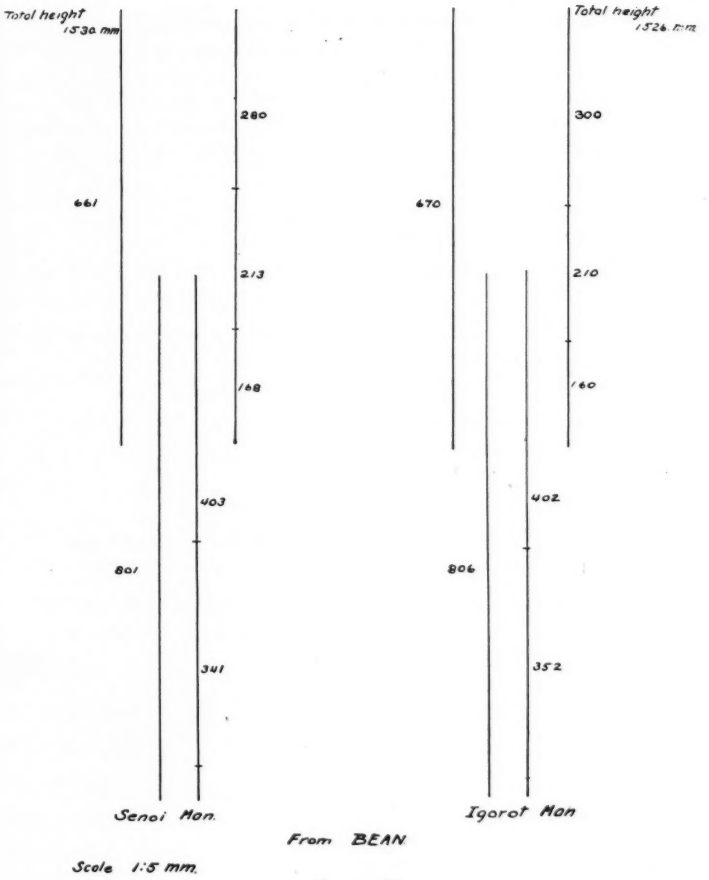

Total height
1530 mm
280
661
213
168
403
801
341
Senoi Man.
Total height
1524 mm.
300
670
210
160
402
806
352
Igorot Man
From BEAN
Scale 1:5 mm.

FIGURE 37.

V. Intermembral Correlations.

The amounts of correlation in such measurements as the length of the arm as compared with that of the leg, or between the lengths of their component parts, seem to us of great value and interest. Correlations between the actual lengths of different parts of the body, as well as correlations between indices, offer an almost untouched field to the anthropometrist. In this place we present such correlations only between absolute lengths of arm and leg.

I The coefficient of correlation between the length of the arm and the length of the leg is .63 .63
This is a large coefficient and shows a large amount of correlation.

II The coefficient of correlation between the length of the humerus and the length of the femur is .17. This shows only a small amount of correlation. .17

III The coefficient of correlation between the length of the radius and the length of the tibia is .40, showing a moderate degree of correlation. .40

IV The coefficient of correlation between the length of the hand and the length of the foot is .43, showing a moderate degree of correlation. .43

V The coefficient of correlation between the length of the arm and the total height is .63, showing a large amount of correlation. .63

VI. Breadths.

TABLE 87.

Biacromial Breadth.

Class	*Frequency*
300 to 304.99 mm.	1
305	0
310	1
315	0
320	4
325	5
330	1
335	9
340	17
345	12
350	7
355	9
360	8
365	9
370	7
375	3
380	3
385	3
390	1
	100

The mean is 352.39 mm.
The extremes are 302 mm.
391 mm.
The standard deviation is 17.25 mm.
The coefficient of variation is 4.90
The index of biacromial breadth to total height is *21.5*
The index of biacromial breadth to trunk length is *52.5*

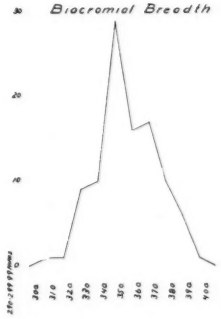


Figure 38.

RESULTS OF OTHER AUTHORS: INDEX OF BIACROMIAL BREADTH TO TOTAL HEIGHT.

Mainly from Martin.

Europe

Race	*Author*	♂	♀
Lithuanians	Martin	18.1	18.0
French	Topinard	18.9	16.3
"	Collignon	20.3	
"	Lyon	21.2	19.9
"	Godin	22.8	
Russians	Teumin		21.0
Jews	"		21.0
"	Weissenberg	22.0	21.9
Polish Jews	Martin	22.1	20.6
Letts	"	23.0	
People of Baden	"	23.0	22.4
Belgians	"	23.4	22.0

Asia

Sojots	Gorostschenko		18.5
Tatars	Martin	20.3	19.8
Jakuts	Mainoff	21.2	20.9
North Tunguses	"		21.76
North Chinese	Martin	22.0	
Igorotes	"	22.6	21.8
Setchuan Chinese	"	23.1	
Cossacks	"	23.2	
Tunguses	Brodsky		22.2
Jukagirs	"		22.2
Jakuts	"		21.6
Buriats	Martin	23.5	
Ainu	Koganei	23.6	23.2
Anamites	Martin		21.4
Cambodians	"		21.9
Japanese, medium	Bälz	23.5	23.2
" heavy	"	25.0	25.3
Kubu	Martin	24.1	22.7
Kalmucks	"	24.5	23.4
Formosans	"	25.3	

Africa

Lobi	Martin	18.6	17.7
Dschagga	"	19.8	

Race	*Author*	♂	♀
Somali	Martin	20.0	
Ba-Binga	"	20.0	20.1
Bushmen	"	20.0	20.0
Bugu	"	20.5	
Jakoma	"	20.6	
Massai	"	20.7	
Tunisians	"	21.3	
Fiot	"	21.7	
Sudanese	"	21.8	
Ba-Tua	"	22.0	20.6
M'Baka	"	22.0	21.0
Fans	"	22.4	21.4
Mawambi Pygmies	"	22.7	20.4
Suaheli	"	24.4	
Togo	"	25.0	
Duala	"	25.3	
	Oceanic Islands		
Goliathberg Pygmies	Martin	21.9	
Merauké	"	23.1	22.1
	America		
Iroquois	Gould	18.8	
Trumai	Martin	21.0	21.5
Athabascan Indians	"	22.1	22.0
" "	Boas		22.24
Colorado Indians	Martin	22.5	22.7
Eskimos	Boas		21.83
Nunatagmiut Eskimos	"		21.2
Koukapamiut "	"	22.8	22.0
Nahuqua	Martin	22.9	21.6
Shoshoni Indians	"	23.2	22.6
Bororó	"	23.6	21.5
Bakairi	"	24.7	23.9
Eskimos	"	24.3	22.7

The biacromial index is smaller in the female than in the male. This index is larger in the women of the United States (21.5) than in the European and is smaller than in the Asiatic women.

TABLE 88.

Thoracic Breadth.

Class	*Frequency*
220 to 224.99 mm.	8
225	6
230	10
235	10
240	10
245	4
250	7
255	5
260	3
265	1
270	2
275	0
280	1
	67

The mean is 239.14 mm.
The extremes are 222 mm.
. 281 mm.
The standard deviation is 13.35 mm.
The coefficient of variation is 5.60
The index of thoracic breadth to total height is *14.6*
The index of thoracic breadth to trunk length is *35.6*
The index of thoracic breadth to biacromial breadth is *68.1*
The index of thoracic breadth to cristal breadth is *87.8*
The index of thoracic breadth to spinal breadth is *93.5*

TABLE 89.

THORACIC DEPTH.

Class	*Frequency*
135 to 139.99 mm.	2
140	1
145	2
150	2
155	1
160	6
165	16
170	10
175	10
180	7
185	4
190	2
195	1
200	0
205	1
210	0
215	1
220	0
225	0
230	1
	67

The mean is 173.69 mm.
The extremes are 139 mm.
230 mm.
The standard deviation is 15.75 mm.
The coefficient of variation is 9.10
The index of thoracic depth to total height is *10.6*
The index of thoracic depth to trunk length is *25.9*
The index of the mean thoracic depth to mean thoracic breadth is *72.6*

TABLE 90.

THORACIC INDEX.
(Depth to breadth.)

Class	*Frequency*	
60 to 61.99	3	
62	4	
64	1	
66	8	
68	6	The mean is 71.71
70	10	The extremes are 60.00
72	13	85.00
74	10	The standard deviation is 5.08
76	7	The coefficient of variation is 7.08
78	2	There is a difference of .92 between the mean
80	1	thoracic index, and the index of the mean
82	1	thoracic depth to the mean thoracic breadth.
84	1	
	67	

RESULTS OF OTHER AUTHORS: THORACIC INDEX.

	Depth	Breadth	Index
African Negroes	195	269	138.0
Hova	179	260	143.5
Navajo	216	297	137.5
French	194	269	138.6
Jakoma	..	..	133.0
Bugu	..	..	124.0

These figures are from Martin and give the more usual relation of the *breadth* to the *depth*. The corresponding figures for the women of the United States we find to be 137.9.

TABLE 91.

BIMAMMILLARY BREADTH.

Class	*Frequency*	
150 to 154.99 mm.	1	
155	0	
160	1	
165	2	The mean is 195.49 mm.
170	2	The extremes are 150 mm.
175	2	223 mm.
180	7	The standard deviation is 15.10 mm.
185	11	The coefficient of variation is 7.72
190	9	The index of bimammillary breadth to total height
195	10	is *11.9*
200	8	The index of bimammillary breadth to trunk
205	3	length is *29.1*
210	4	The index of bimammillary breadth to biacromial
215	6	breadth is *55.5*
220	4	
	70	

RESULTS OF OTHER AUTHORS: BIMAMMILLARY BREADTH.

From Martin.

	♂	♀		♂	♀
Massai	113 mm.	..	Tatars	127 mm.	132 mm.
Dschagga	113 mm.	..	Russians and		
Ba-Tua	113 mm.	..	Jews (Teumin)	..	200 mm.
M'Baka	120 mm.	126 mm.			
People of Baden	122 mm.	..			
Ba-Binga	126 mm.	..			

The above data are not of much value for comparison as they are mostly measurements of males. The bimammillary breadth of Russian women is larger than that of Americans, and the index of this breadth to the total height is 60.0 in the case of the Russian women, who are short, and only 55.0 in the case of the Americans. This difference may be due entirely to the amount of development of the glands. We have endeavored to eliminate as much of this error as possible by omitting all subjects with pendulous breasts.

TABLE 92.

Spinal Breadth.

Class	*Frequency*
210 to 214.99 mm.	1
215	1
220	0
225	3
230	2
235	3
240	4
245	6
250	9
255	13
260	7
265	4
270	5
275	3
280	5
285	1
	67

The mean is 256.22 mm.
The extremes are 211 mm.
285 mm.
The standard deviation is 14.85 mm.
The coefficient of variation is 5.80
The index of spinal breadth to total height is *15.6*
The index of spinal breadth to trunk length is *38.4*
The index of spinal breadth to biacromial breadth is *72.9*
The index of spinal breadth to cristal breadth is *94.1* .

TABLE 93.

Cristal Breadth.

Class	*Frequency*
210 to 214.99 mm.	2
215	0
220	0
225	1
230	0
235	1
240	2
245	3
250	5
255	7
260	7
265	14
270	12
275	15
280	8
285	6
290	7
295	6
300	2
305	1
310	1
	100

The mean is 272.34 mm.
The extremes are 210 mm.
313 mm.
The standard deviation is 18.80 mm.
The coefficient of variation is 6.90
The index of cristal breadth to total height is *16.6*
The index of cristal breadth to trunk length is *40.6*
The index of cristal breadth to biacromial breadth is *77.3*

TABLE 94.

TROCHANTERIC BREADTH.

Class	*Frequency*
205 to 209.99 mm.	6
210	4
215	10
220	11
225	12
230	8
235	11
240	7
245	11
250	5
255	4
260	2
265	2
270	1
275	2
280	3
285	0
290	0
295	0
300	1
	100

The mean is 236.69 mm.
The extremes are 205 mm.
304 mm.
The standard deviation is 19.40 mm.
The coefficient of variation is 8.19
The index of trochanteric breadth to total height is *14.4*
The index trochanteric breadth to trunk length is *35.3*
The index of trochanteric breadth to biacromial breadth is *67.2*
The index of trochanteric breadth to cristal breadth is *86.9*

RESULTS OF OTHER AUTHORS: SPINAL, CRISTAL AND TROCHANTERIC BREADTHS.
(Females only.)

From Brodsky.

Index to total height.

Race	*Author*	Spinal	Cristal ♂	Trochanteric ♀
Russians and Jews	Teumin	16	18	..
North Tunguses	Mainoff	..	18.6	..
South Tunguses	"	..	19.22	..
Sojots	Gorotschenko	..	..	..
Ainu	Koganei	16.3	18	20.4
Japanese	Osawa	16.1	17.9	19.8

Race	Author	Spinal	Cristal ♂	Trochanteric ♀
Jakuts	Brodsky	16.6	18.6	20.2
Tunguese	"	16.6	18.4	19.9
	Absolute lengths.			
Russians and Jews	Teumin	250 mm.	280 mm.	..
North Tunguses	Mainoff	..	268	..
South Tunguses	"	293.6	293.6	..
Sojots	Gorostschenko	..	267	..
Javans	Strasser	230	250	280
Ainos	Koganei	239	264	300
Japanese	Osawa	235	262	284
Jakuts	Brodsky	254	277	301
Tunguses	"	243	268	293

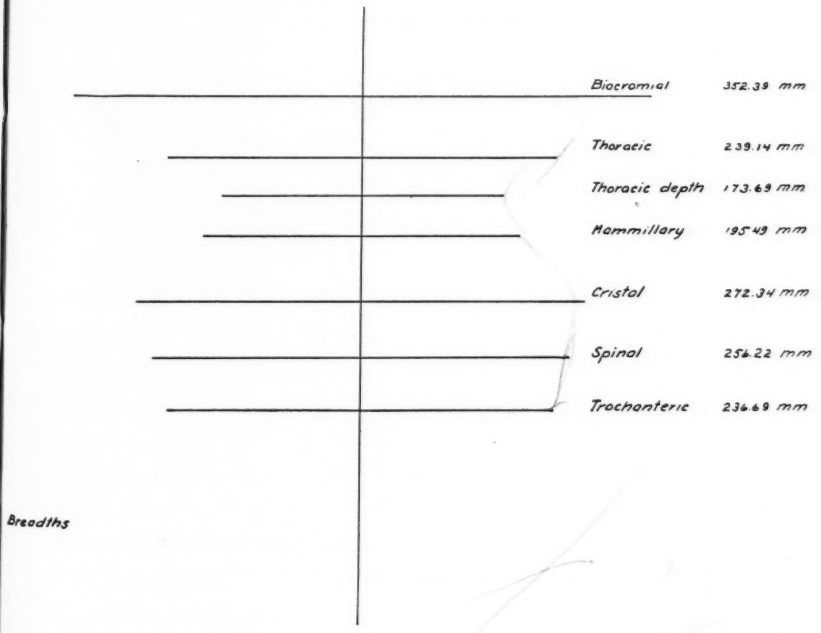


FIGURE 39.

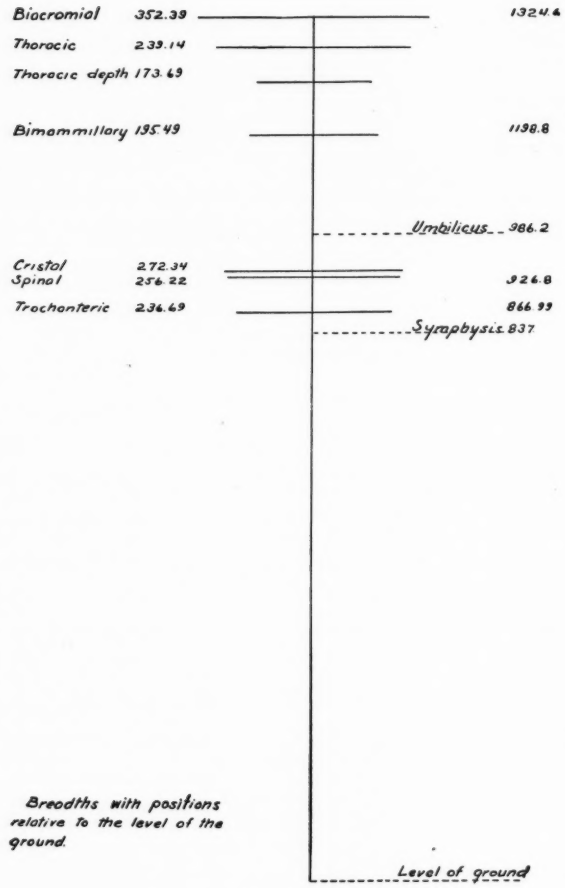

Biacromial 352.39
1324.4
Thoracic 239.14
Thoracic depth 173.69
Bimammillary 195.49
1138.8
Umbilicus 986.2
Cristal 272.34
Spinal 256.22
926.8
Trochanteric 236.69
866.99
Symphysis 837
Breadths with positions relative to the level of the ground.
Level of ground

FIGURE 40.

VII. Individual Measurements of the One Hundred Subjects Used in This Paper.

The individual measurements of the 100 subjects used in this paper have been published in the "Manual of Anthropometry" of the senior author (Blakiston, Philadelphia, 1920), in which it appears as Appendix B, pp. 171–185. Since these figures have already been published, and since especially there is great risk of typographical errors in printing so extensive a series of figures, it has been determined not to duplicate them here, but to refer readers to them.

VIII. Summary of Averages and Indices.

HEIGHT FROM FLOOR.

	Average in man	Index to total height
Total height	1638.0 mm.	
Height of tragus	1510.0	*92.0*
Height of vertebra prominens	1399.6	*85.5*
Height of incisura sterni	1342.2	*81.7*
Height of acromium	1324.6	*81.0*
Height of nipple	1198.8	*73.3*
Height of umbilicus	986.2	*60.4*
Height of ant. spine of ilium	926.8	*56.5*
Height of trochanter	867.0	*53.0*
Height of symphysis pubis	839.0	*51.2*
Height of elbow	1035.2	*63.2*
Height of styloid process of radius	790.5	*48.3*
Height of tip of middle finger	613.8	*37.5*
Height of knee	414.6	*25.3*
Height of inner malleolus	78.7	*4.8*

SITTING HEIGHTS.

		Index to total height
Total sitting height	864.5	*52.7*
		Index to total sitting height
Height of vertebra prominens	626.9	*72.5*
Height of incisura sterni	564.2	*65.2*
Height of acromium	546.6	*33.3*

MEASUREMENTS OF THE HEAD.

Length of head	186.88 mm.
Breadth of head	147.11
Height of head	128.14
Frontal breadth	102.72
Interorbital Breadth	31.17
Zygomatic breadth	116.35
Mandibular breadth	98.27
Facial lengths	
Physionomic	175.59
Anatomical	115.35
Superior	72.07
Length of nose	53.61
Breadth of nose	32.18
Length of ear	58.89
Breadth of ear	30.99

Indices	
Cephalic	*78.96*
Height to length	*68.70*
Anatomical facial (zygomatic breadth to anatomical length)	*100.65*
Mandibulo-zygomatic (mandibular breadth to zygomatic breadth)	*84.09*
Nasal	*59.89*
Aural	*50.63*
Height of head to total height	*7.88*
Height of head to trunk length	*18.61*

MEASUREMENTS OF ARM AND LEG.

A. Arm Measurements.

Arm stretch	1647.4 mm.
Length of arm	707.5
Length of humerus	286.7
Length of radius	245.2
Length of hand	177.6
Length of humerus + radius	531.9

Indices	To total height	To trunk length
Arm stretch	*101.0*	
Arm	*43.3*	*106.0*
Humerus	*17.5*	*42.8*
Radius	*14.9*	*36.7*

		To total height	To trunk length
Hand		*10.8*	*26.7*
Humerus + radius		*32.4*	*79.2*
Humerus to arm	*40.5*		
Radius to arm	*34.8*		
Hand to arm	*25.1*		
Radius to humerus	*85.5*		
Arm to leg	*81.5*		
Humerus to femur	*63.3*		
Radius to tibia	*73.4*		
Hand to foot	*73.6*		
Humerus + radius to femur + tibia	*67.6*		

B. LEG MEASUREMENTS.

Length of leg (height of trochanter)	867.0 mm.
Height of knee	414.6
Length of femur	453.0
Length of tibia	334.2
Length of foot	240.7
Height of inner malleolus	78.7
Length of femur and tibia	787.0

Indices		To total height	To trunk length
Leg		*53.0*	*128.6*
Knee height		*25.3*	
Femur		*27.6*	*67.7*
Tibia		*20.4*	*50.2*
Foot		*15.1*	*36.1*
Femur + tibia		*48.0*	*117.1*
Inner malleolus height		*4.8*	*11.7*
Femur to leg	*52.3*		
Tibia to leg	*38.7*		
Foot to leg	*24.1*		
Inner malleolus height to leg	*9.1*		
Tibia to femur	*73.8*		
Arm to leg	*81.5*		
Humerus to femur	*63.3*		
Radius to tibia	*73.4*		
Hand to foot	*73.6*		
Humerus + radius to femur + tibia	*67.6*		

MEASUREMENTS OF THE TRUNK.

Length of the trunk, tragus to symphysis	671.29 mm	
Length, incisura to symphysis	503.99	
Length, incisura to nipple	141.27	
Length, symphysis to nipple	362.60	
Length, incisura to umbilicus	356.69	
Length, symphysis to umbilicus	147.30	
Indices		
Trunk length to total height		*41.1*
(Length, incisura–sym.) to (total height)		*30.8*
(Length, sym.–nipple) to (length, incisura–sym.)		*72.4*
(Length, sym.–umbilicus) to (length, umbilicus–incisura)		*41.3*
(Length, sym.–umbilicus) to (length, incisura–sym.)		*28.9*
(Length, nipple–incisura) to (length, sym.–nipple)		*39.0*
Mid-point of total height	820.00 mm.	
Difference between height of symphysis and the mid-point	19.00	
Difference between the height of umbilicus and mid-point	163.99	
Difference between the height of umbilicus and spine	59.84	
Difference between height of spine and symphysis	88.04	
Difference between height of trochanter and symphysis	28.14	
Difference between height of spine and trochanter	60.23	
Difference between height of incisura and of acromium	17.99	
Difference sitting	18.89	
Difference between total height and height of vertebra prominens	238.04	
Difference sitting	237.84	
Difference between height of vertebra prominens and incisura	57.59	
Difference sitting	63.19	
Difference between height of vertebra prominens and acromium	75.94	
Difference sitting	81.19	
Difference between height of tragus and vertebra prominens	110.55	
Difference between height of tragus and incisura	168.89	
Difference between total height and height of incisura	296.09	
Difference sitting	299.74	

MEASUREMENTS OF BREADTHS.

Biacromial	352.39 mm.
Cristal	272.34
Trochanteric	236.69
Bimammillary	195.49
Spinal	256.22
Thoracic breadth	239.14
Thoracic depth	173.69

Indices		To total height	To trunk length
Biacromial		*21.5*	*52.5*
Cristal		*16.6*	*40.6*
Trochanteric		*14.4*	*35.3*
Bimammillary		*11.9*	*29.1*
Spinal		*15.6*	*38.4*
Thoracic breadth		*14.6*	*35.6*
Thoracic depth		*10.6*	*25.9*
Thoracic depth to breadth	*71.7*		
Cristal to biacromial	*77.3*		
Trochanteric to biacromial	*67.2*		
Bimammillary to biacromial	*55.5*		
Spinal to biacromial	*72.9*		
Thoracic breadth to biacromial	*68.1*		
Spinal to cristal	*94.1*		
Thoracic breadth to cristal	*87.8*		
Thoracic breadth to spinal	*93.5*		

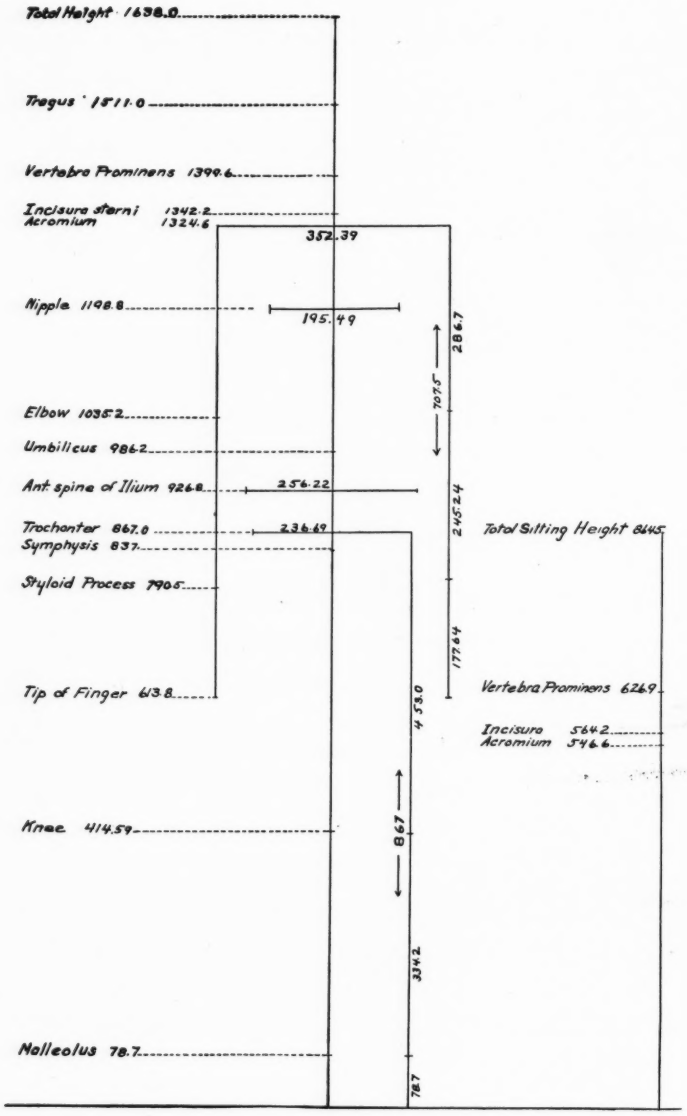

Total Height 1638.0
Tragus 1511.0
Vertebra Prominens 1399.6
Incisura sterni 1342.2
Acromium 1324.6
352.39
Nipple 1198.8
195.49
286.7
707.5
Elbow 1035.2
Umbilicus 986.2
Ant. spine of Ilium 926.8
256.22
245.24
Trochanter 867.0
236.69
Symphysis 837
Total Sitting Height 864.5
Styloid Process 790.5
177.64
Vertebra Prominens 626.9
Tip of Finger 613.8
458.0
Incisura 564.2
Acromium 546.6
867
Knee 414.59
334.2
Malleolus 78.7
78.7

FIGURE 41.

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